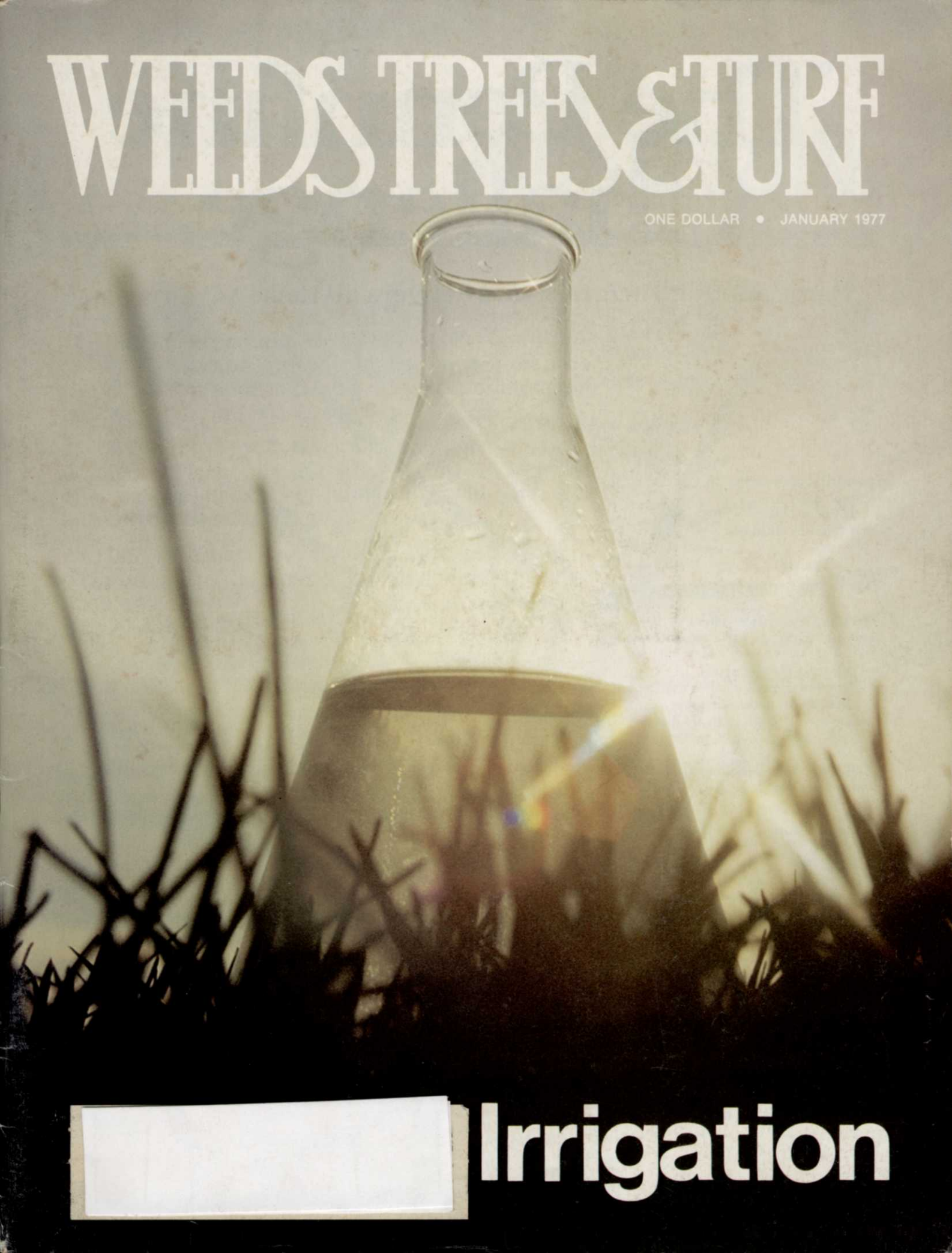
WEEDS TREES & TURF

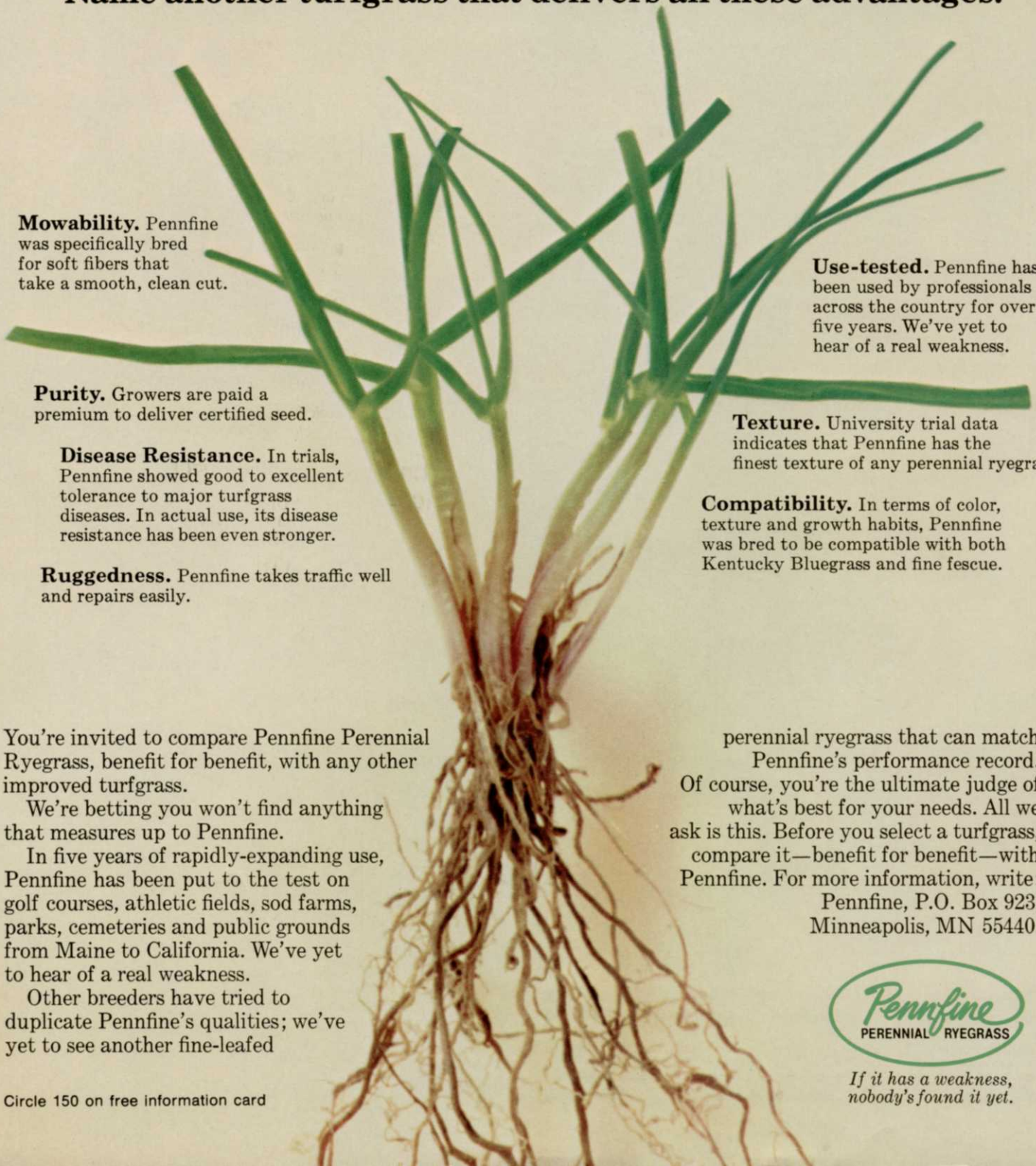
ONE DOLLAR • JANUARY 1977



Irrigation

The Pennfine Challenge.

Name another turfgrass that delivers all these advantages.



Mowability. Pennfine was specifically bred for soft fibers that take a smooth, clean cut.

Purity. Growers are paid a premium to deliver certified seed.

Disease Resistance. In trials, Pennfine showed good to excellent tolerance to major turfgrass diseases. In actual use, its disease resistance has been even stronger.

Ruggedness. Pennfine takes traffic well and repairs easily.

Use-tested. Pennfine has been used by professionals across the country for over five years. We've yet to hear of a real weakness.

Texture. University trial data indicates that Pennfine has the finest texture of any perennial ryegrass.

Compatibility. In terms of color, texture and growth habits, Pennfine was bred to be compatible with both Kentucky Bluegrass and fine fescue.

You're invited to compare Pennfine Perennial Ryegrass, benefit for benefit, with any other improved turfgrass.

We're betting you won't find anything that measures up to Pennfine.

In five years of rapidly-expanding use, Pennfine has been put to the test on golf courses, athletic fields, sod farms, parks, cemeteries and public grounds from Maine to California. We've yet to hear of a real weakness.

Other breeders have tried to duplicate Pennfine's qualities; we've yet to see another fine-leafed perennial ryegrass that can match Pennfine's performance record. Of course, you're the ultimate judge of what's best for your needs. All we ask is this. Before you select a turfgrass, compare it—benefit for benefit—with Pennfine. For more information, write: Pennfine, P.O. Box 923, Minneapolis, MN 55440.

Pennfine PERENNIAL RYEGRASS

If it has a weakness, nobody's found it yet.

Circle 150 on free information card

WEEDS TREES & TURF®

JANUARY 1977, Vol. 16, No. 1

15 Buying Automatic Irrigation — The awesome job of purchasing a new irrigation system can be simplified by applying logic. One superintendent tells how he did it successfully.

20 A Pulled Pipe System for Drainage — Proper drainage is essential for healthy turf and plastic pipe can be installed to handle this with little disturbance to the land.

22 GCSAA Show Preview — More than 5000 people ar expected to attend this outstanding conference and show in February. Here is a look at what you'll find there.

28 The Meticulous Consultant — Veteran Irrigation Consultant Don Burns explains some of the unique concepts that have made him one of the most sought after specialists from Fresno to Maui.

42 Black Cutworm Control — Cutworms in the larval stage cause severe damage to turf and plants but they can be controlled by several new and established materials.

Editorial 4
Government News 8
Industry News 12
From the Campus 46
Meeting Dates 48
People on the Move 50
New Products 62
Classifieds 64
Advertisers' Index 64

ON THE COVER: This month the emphasis is on irrigation, an all-important aspect of the Green Industry.

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TO OUR READERS —

December was a busy month for the WEEDS TREES & TURF staff. On the 8th, I headed for Columbus for the Ohio Turfgrass Conference and Show while Assistant Editor Eric Friedman went East to New Jersey Turfgrass Expo 76.

Going to these conferences and shows has got to be one of the most rewarding aspects of the job. It's here where we really get to meet our readers and contributors face-to-face. Communication is open, uninhibited.

The show in Columbus was a fantastic success. Nearly 1200 people attended the three-day series of seminars and exhibits. Among the notables was Dr. Robert Schery, director of the Lawn Institute. Dr. Schery was the author of our article on cultivars (October 1976). A friendly, personable man, he said feedback has been excellent and has promised to do another piece for us.

Among the many seminars I attended was one presented by Steven Kennedy, superintendent of the Columbus Country Club, on buying an irrigation system. Kennedy's talk was well received, and since our focus this month is irrigation, I got it all on tape. We present his straight-from-the-hip advice on page 15. Unfortunately, we could not transcribe his humor which struck familiar chords with many in the audience.

Friedman tells me his experience at the New Jersey Expo was "most edifying." He was hosted by Dr. Henry Indyk, the tireless, paternal chairman of the conference. In summing up the conference, Dr. Indyk told WEEDS TREES & TURF that a major objective was to bring together the total turfgrass industry.

"The format of the New Jersey Turfgrass Expo 76 effectively provided an opportunity not only for the dissemination of useful information on a wide range of topics, but also as an attractant for the unification of the heterogeneous mix which comprises the total turf industry."

Even more importantly, he added, than the attendance figures, which totaled more than 800, were the diverse turfgrass interests that were attracted for the pursuit of a common objective — increased knowledge' for better turf. "It was Green Power in the true sense of the phrase."

After Expo 76, Friedman went west to La Jolla, California, to interview irrigation consultant Don Burns. Because of the hectic pace that Burns maintains, he was not the ideal subject for a fireside tete-a-tete. Friedman stalked him from the serene, coastal refuge into the desiccated flatlands of the Palm Desert where an omnipresent sun and the Santa Ana winds bake the picachos and breathe quick warmth into the desert bowl. How does Don Burns irrigate a barren wasteland? Find out on page 28.

More travel as that is the name of the game. We'll be heading west in January for the annual meeting of the Associated Landscape Contractors of America and to Dallas for the Southern Weed Science Society. We'll also be at the Golf Course Superintendents Association of America convention in Portland in February. WEEDS TREES & TURF will have an exhibit booth. Stop in and talk with us. We need to hear from you.

Now we must get a bit more somber. As we put together our irrigation issue we were constantly reminded of man's incredible indifference to his own well being.

In the past year we have witnessed drought-like conditions reminiscent, perhaps, more of an episode from the "Twilight Zone" than of days we can recall. Water has become a priceless commodity.

Data compiled by the Agricultural Climatology Service Office of the Departments of Agriculture and Commerce in Washington yield the conclusion that the eastern Dakotas, Minnesota, northern and western Iowa, eastern Nebraska, and portions of Missouri suffered drought patterns similar to the record drought of the 1930s. Irregular rainfall patterns across the United States caused a multitude of drought-drainage problems. These were compounded by high temperatures and stiff winds, resulting in extensive turf damage.

For some reason, complacent folks that we are, we respond with alarm to crisis situations, but we fail to make ongoing provisions for addressing the source of the problem once the furor has waned.

We are extremely fortunate to possess the caliber of technology which can attempt to balance some of the mysterious inequities of the ecosystem. The highly evolved state of our irrigation systems and products is a tribute to our ingenuity. We must, however, learn as a nation that an inordinate sense of economic well being and technological prowess coupled with indulgent overuse of our natural resources is a formula for disaster.

In the coming year we must necessarily measure our uses of water against our own stringent guidelines for need.

Gail D. Hogan

For ad on following page circle 107 on free information card

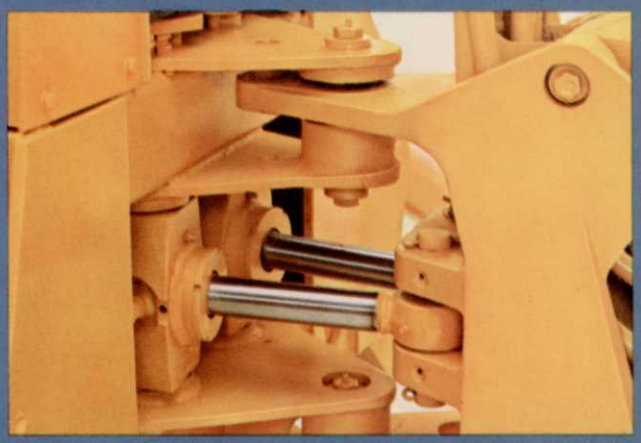
STRENGTH—
a plus with John Deere Loader/Backhoes

Strength for enduring the hard knocks of loading and digging is what you can expect from John Deere's 43-, 50-, and 62-net-hp loader/backhoes.

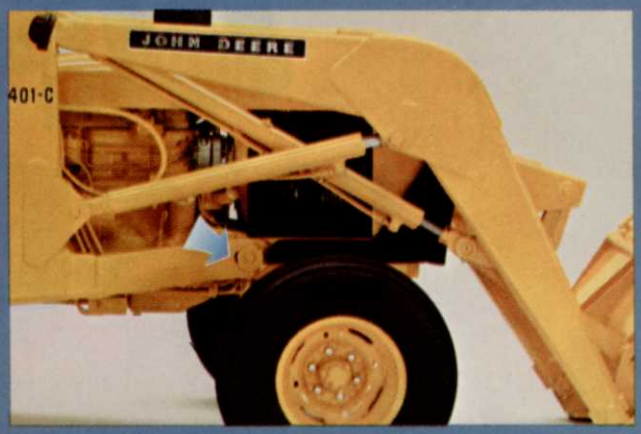
The detachable 9250-A Backhoe with 2-lever control gives you nearly 13 feet 8 inches of digging depth and a 17-foot 5-inch reach. Its dual swing cylinders reduce the number of moving parts in the swing linkage, to aid sidecutting ability and positive swing, even on uphill grades. There are fewer daily grease points, too.

The integral loader has heavy reinforcing at vital stress points. Front mounting of loader is designed for horizontal float so shock loads can be absorbed in the rear axle mounting pads.

Each loader/backhoe is equipped with hydraulic direction reverser, differential lock, and single-lever loader control. Ask your John Deere dealer for all the details. John Deere, Moline, Illinois 61265.



The 9250-A Backhoe utilizes dual swing cylinders that provide 11,083 foot-pounds of swing torque.



Loader booms are reinforced at the arch point with the plate applied to *both* sides of the boom. Slotted mounting point (arrow) permits horizontal float.

Circle 107 on free information card

JOHN DEERE

JOHN DEERE on the move

THE 44-INSECT INSECTICIDE.

 Circle 119 on free information card

For trees, ornamentals, and turf.
One solution versus 44 problems. Those are pretty good odds.

Especially since you can't always be sure which insects will threaten the valuable trees, turf and ornamentals you protect. And people enjoy.

This broad-spectrum control with SEVIN® carbaryl insecticide takes some of the chance out of your job.

Its versatility also lets you cut down on the need for a large chemical inventory.

STOP! ALL PESTICIDES CAN BE HARMFUL TO HEALTH AND THE ENVIRONMENT IF MISUSED. READ THE LABEL CAREFULLY AND USE ONLY AS DIRECTED.

Why use an array of different brands with different instructions, if you can do the job effectively with a single product? You'll enjoy less nozzle changing, chemical switching and tank flushing. All good reasons to rely on dependable SEVIN.

Use it in any of its available forms to suit your needs. Choose from wettable powders, flowables and liquid SEVIMOL® 4.

And many SEVIN formulations are compatible with most commonly used fungicides, miticides and other insecticides.

With the increased awareness and concern for protecting the environment, it's nice to know that SEVIN carbaryl is biodegradable. It does not build up in the soil or in plant and animal tissue.

Also, when compared with many other insecticides, SEVIN ranks low in toxicity to people, animals, birds and fish.

There's another advantage to using SEVIN in parks, golf courses and other recreational areas–even home yards and gardens. Short re-entry time. Treated areas can be re-entered as soon as the spray dries or dust settles.

PLANTS	INSECTS CONTROLLED
HERBACEOUS ANNUAL, BIENNIAL AND PERENNIAL PLANTS such as carnation, chrysanthemum, gladiolus, iris, peony, zinnia, etc.	blister beetles, boxelder bug, flea beetles, Japanese beetle, June beetles, lace bugs, leafhoppers, leafrollers, mealy bugs, plant bugs, psyllids, rose aphid, thrips (exposed).
SHRUBS, TREES AND WOODY PLANTS such as ash, arborvitae, azalea, barberry, beech, birch, boxwood, catalpa, cedar, cypress, dogwood, elm, euonymus, fir, ginko, hackberry, hawthorn, holly, honeysuckle, hydrangea, juniper, lilac, magnolia, maple, oak, pine, redbud, rose, spruce, sycamore, tulip-tree, etc.	apple aphid, bagworms, birch leaf miner, boxelder bug, boxwood leaf miner, cankerworms, catalpa sphinx, Cooley spruce gall aphid, Eastern spruce gall aphid, elm leaf aphid, elm leaf beetle, elm spanworm, eriophyd mites, gypsy moth, Japanese beetle, June beetles, lace bugs, leafhoppers, leafrollers, mealy bugs, mimosa webworm, oak leaf miner, orange striped oakworm, orange tortrix, periodical cicada, plant bugs, puss caterpillar, rose aphid, roseslug, saw flies (exposed), scale insects, spruce needle miner, tent caterpillars, thorn bug, thrips (exposed), webworms, willow leaf beetles, yellow poplar weevil.
LAWNS, TURF	ants, bluegrass billbug, chiggers, chinch bugs, cutworms, earwigs, European chaffer, fall armyworm, fleas, green June beetle, leafhoppers, millipedes, mosquitoes, sod webworm (lawn moths), ticks.

NOTE: SEVIN will injure Boston Ivy, Virginia Creeper, and Maidenhair fern.

Make a quick check of the plants and insects for which SEVIN carbaryl is registered. See how many problems it can solve for you. In all there are over 160 pests on more than 100 plants. This broad registration minimizes the problem of drift to adjacent areas.

This year, ask your pesticide supplier for SEVIN carbaryl–the insecticide with a proven performance record in fighting plant pests.

SEVIN® UNION CARBIDE
CARBARYL INSECTICIDE
STILL THE ANSWER.

SEVIN and SEVIMOL are registered trademarks of Union Carbide Corporation for carbaryl insecticide.
Union Carbide Corporation, Agricultural Products Division, P.O. Box 1906, Salinas, CA 93901.

Circle 119 on free information card

Government News

EPA proposes to cancel BHC, a chemical used in pesticides manufacture, and asks for public comment on risks and benefits of pesticides containing benzene hexachloride. Despite the fact that BHC for use in other pesticides is no longer being made, some 58 U.S. firms are still employing old BHC stocks to produce some 86 different pest control products.

Scientists at the University of Wisconsin will study feasibility of transferring chloroplasts from one plant species to another, under a cooperative agreement with the USDA. USDA Agricultural Research Service will provide $59,918 for the two-year study.

The USDA made three changes in the citrus blackfly quarantine: 1) replaced emergency regulations on the recent Florida outbreak with more formal citrus blackfly quarantine; 2) extended the regulated area in Florida to two additional counties; and 3) added two articles to the list of restricted items.

Three national parks and three national forest areas are the first to be officially recognized as Biosphere Reserves in the U.S. The Biosphere Reserve Project is an effort of the international Man and the Biosphere Program to protect representative segments of the world's natural regions as major centers for animal and plant preservation, environmental research, and education.

The six designated areas are: Coweeta Experimental Forest, N.C.; Great Smokey Mountains National Park, Tenn. and N.C.; Hubbard Brook Experimental Forest, N.H.; Everglades National Park, Fla.; Virgin Islands National Park, V.I.; and Luquillo Experimental Forest, P.R.

Use of Mirex for fire ant control is to be discontinued by June 28, 1978. EPA Administrator Russell Train accepted the cancellation plan proposed by the state of Mississippi to end all use of the pesticide in the South. Train agreed to gradually phase out federal permission for Mirex production and use. Airplane applications against fire ants will end December 31, 1977. Ground treatment ends six months later. During the phase-out, more environmentally acceptable Mirex 10:5 will be substituted for current 4X bait.

Further increases in minimum wage become effective January 1, 1977. Seasonal exemptions will be eliminated. The minimum wage for agricultural employees becomes $2.20/hour on January 1, and $2.30/hour for other employees covered by law.

"They cut down a lot on labor costs."

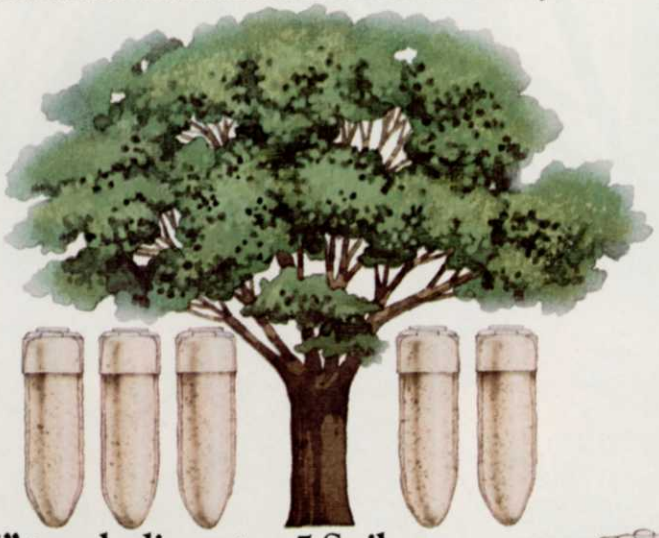
Tony Kimball, Superintendent, Deerwood Country Club, Jacksonville, Florida

"We put Jobe's Spikes out in no time at all. We bought the first cases on an experimental basis, and we're really pleased with them. We'll continue with the Spikes.

"We can afford to feed a lot more trees now because we can do it in a lot less time."

It makes dollars and sense to feed trees with Jobe's.

You can expand your tree feeding business and take better care of the trees you're now responsible for with Jobe's® Tree and Shrub Spikes. A 5' tree needs 5 Spikes, and it takes just about 5 minutes to get the job done. How long would it take to feed that 5" tree by drilling? About 30 minutes? With the cost of labor these days, you can see it makes dollars and sense to feed trees with Jobe's.



5" trunk diameter, 5 Spikes.

"We use one for each inch of diameter. Figuring, say, a 5" tree, that's $1.50 a tree. If we weren't using Jobe's Spikes, we would probably be using a slow-release, high-nitrogen fertilizer. Compared to that, the cost is drastically cut by using Jobe's Spikes."

Now Jobe's offers Evergreen and Fruit Tree Spikes, too.

You can meet most feeding situations with Jobe's Tree and Shrub Spikes 16-8-8, Evergreen Spikes 12-6-8 or Fruit Tree Spikes 5-15-15.

They're as effective as drilled fertilizer because rainwater carries the fertilizer down to the root zone. (University leaching studies have proved it.) Jobe's Spikes are better than surface-applied fertilizer because there's no danger of burning turf or excessive leaching.

In every type of climate and every kind of soil from sand to heavy clay, Jobe's Spikes have proved their effectiveness.

A hammer is all the equipment you need.

Jobe's Spikes use a patented binder so the fertilizer forms easy-to-drive spikes. A plastic cap is included to make driving the Spikes easier and to protect the Spike while you drive it.

You can forget about moving bulky drills from job to job. Forget equipment breakage...maintenance bills ... costly replacements.

"You don't have to worry about anybody going out there and messing up."

"You can't mess up with Jobe's Spikes. Until now we fertilized trees by drilling or by spreading fertilizer on the surface. With Jobe's you don't have to worry about burning. You don't have to worry about the bag splitting.

"Very handy and easy to install around trees. They cut down a lot on labor costs."

Tony Kimball is saving time and making money with Jobe's. How about you?

Jobe's Evergreen Spikes 12-6-8 and Fruit Tree Spikes 5-15-15 are now available in bulk. They can be combined for shipping with Tree and Shrub Spikes.

Call your local Jobe's distributor or order direct. $30 per case (105 Spikes) prepaid, 5 case minimum. 15 or more cases, $25 per case. 36 or more cases, $21 per case.

Jobe's®
TREE & SHRUB SPIKES

The easy method for professional tree care.
International Spike, Inc., 462 East High St.
Lexington, Kentucky 40508.

Diazinon controls more any other major

Over twenty turf insects are listed on the Diazinon® label. More than any other major turf insecticide.

Granted, a turf manager must be able to recognize an insect problem. And know when to apply treatment for the most effective control.

But when you've got Diazinon, the one broad-spectrum turf insecticide with the label to prove it works for you, it sure makes things easier.

The insects: Lawn chinch bugs, Ants, Armyworms, Clover mites, Springtails (Collembola), Crickets,

Circle 127 on free information card

Industry News

EPA establishes new toxic office

EPA Deputy Administrator John R. Quarles has announced the formation of a new office of Toxic Substances, headed by an assistant administrator as authorized by the new Toxic Substances Control Act of 1976.

Quarles said Kenneth L. Johnson, 47, EPA deputy regional administrator in Boston, has been named acting assistant administrator for Toxic Substances.

"We are establishing this office immediately in order to begin a sound and aggressive toxic substances program," Quarles said. He added that the existing Office of Toxic Substances, currently under the assistant administrator for water and hazardous materials, will be transferred to the new assistant administrator's office.

An internal study of the agency will be made to determine if other programs, such as the office of pesticide programs, should be transferred.

Shell picks name for insecticide

Pydrin has been selected as the name for Shell Chemical Company's new synthetic pyrethroid insecticide.

Formerly designated as SD 43775, the new compound was extensively field tested in all major cotton growing regions of the United States during the 1976 season under an experimental use permit from the Environmental Protection Agency.

This past season, Pydrin (SD 43775) was tested by cooperating cotton growers. Effective control was demonstrated on such important insect pests as the tobacco budworm, cotton bollworm, pink bollworm, cotton leaf perforator and boll weevil.

U.S. patent rights for this pyrethroid compound are held by Sumitomo Chemical Co., LTD. Development in the U.S. is being conducted by Shell under agreements with Sumitomo.

UC tree book available

"Trees of the Berkeley Campus," one of the most popular publications of the University of California, has been reprinted and is now available to the public.

The publication describes hundreds of trees and shrubs on the Berkeley campus. Latin and common names are given as well as a description and information about each species. It also lists the location of plants by their proximity to buildings and landmarks.

To obtain a copy of "Trees of the Berkeley Campus," send a check or money order for $5.00 plus sales tax, payable to The Regents of UC, to Agricultural Publications, 1422 South 10th Street, Richmond, California 94804.

39 states split forest profits

Checks totaling more than $49 million have been distributed to 39 states and Puerto Rico as their share of more than $195 million earned from the sale and use of national forest products and services in the fiscal transition quarter.

The USDA said the $49,049,338 returned to the states represents 25 percent of the money collected by the forest service from the sale of timber, and from grazing, recreation, minerals, and other land use charges on national forests between July 1 and Sept. 30 of this year.

Velsicol continues registration fight

"Despited the disappointing results of Velsicol's appeal to the U.S. Court of Appeal concerning the suspension of certain uses of heptachlor and chlordane, Velsicol intends to continue its efforts to maintain the registrations of these pesticides through further efforts in the courts and the cancellation hearings being held by the EPA," according to Robert M. Morris, company president and chairman.

"We believe that the benefits from the proper use of these insecticides far outweigh any risk of exposure to man," said Morris, "and we will continue to support our belief and experience with these products."

U.S. receives Bonsai trees

Fifty three rare bonsai plants have been presented to the American people by the Japanese government to commemorate the United States Bicentennial. The collection, which includes one specimen 350 years old, was described as an "extraordinary gift" by former Secretary of Agriculture Earl Butz at the dedication ceremony in Washington. The plants were presented by the Nippon Bonsai Association in Tokyo. Some were donated by private sources, including the Japanese Royal Family, and others were purchased by the Japan Foundation.

For ad on following page circle 109 on free information card

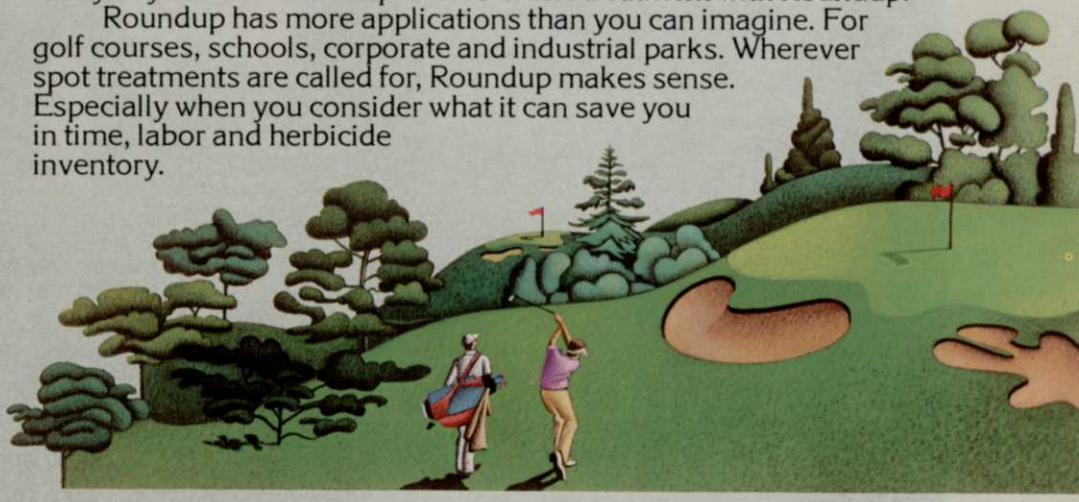
There's never been a herbicide like this before.

"Translocation" is the key.
Roundup is applied to the weed foliage, absorbed through the leaf surface, and "translocated" throughout the entire plant. In this way, Roundup effectively destroys most weeds—roots, rhizomes and all.

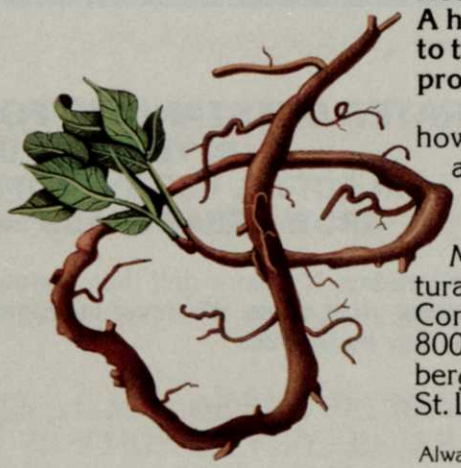
Roundup® herbicide by Monsanto is powerful enough to control many of the toughest annual and perennial weeds in one application.

Once, several different herbicides and frequent repeat treatments were needed. Now, one man with a backpack or tank sprayer can handle many of your weed cleanup chores in one treatment with Roundup.

Roundup has more applications than you can imagine. For golf courses, schools, corporate and industrial parks. Wherever spot treatments are called for, Roundup makes sense. Especially when you consider what it can save you in time, labor and herbicide inventory.



Roundup destroys most emerged annual and perennial grasses and weeds.
Including bluegrass, bermudagrass, quackgrass, bindweed, johnsongrass, fescues, and vaseygrass.



Roundup.
A herbicide that gets to the root of the problem.
To find out how to put Roundup at the root of your weed problems, write: Roundup, Monsanto Agricultural Products Company, C3NJ, 800 North Lindbergh Blvd., St. Louis, Mo. 63166.

Always read and carefully follow the Roundup label directions.

Roundup has no residual soil activity.
And you know what that can mean for your landscaping program. However, for seedling weed control, simply follow your Roundup treatment with an effective residual herbicide.

Monsanto

RI 1/7

FOR MICKEY MANTLE AND WHITEY FORD,

Adelphi
KENTUCKY BLUEGRASS

(U.S. Plant Patent No. 3150)

IS "A WHOLE NEW BALL GAME"

Photography at McGOVERN SOD FARMS, Melville, N.Y.

RATED OUTSTANDING FOR OVERALL PERFORMANCE
...IN YEARS OF UNIVERSITY TESTING
...IN ACTUAL USE BY PEOPLE WHO KNOW GREAT GRASS, GROW GREAT GRASS and DEMAND GREAT GRASS.

Nowadays it's more golf than baseball but Mickey Mantle and Whitey Ford know great grass. Whatever the game, "Adelphi" is the answer for them and it may be for you.

- DARKER GREEN COLOR THE ENTIRE GROWING SEASON
- EXCELLENT DENSITY
- GOOD DISEASE RESISTANCE
- TOLERANCE TO MODERATELY CLOSE MOWING

JOIN THE "ADELPHI" TEAM. IT'S "A WHOLE NEW BALL GAME" IN TURF.

"ADELPHI" HAS BEEN CHOSEN by the Plant Variety Protection Office, U.S.D.A., AS A STANDARD FOR DARK GREEN COLOR to which all bluegrasses applying for plant protection will be compared for color classification.

(Use of this statement does not indicate any approval or recommendation of Adelphi by the U.S.D.A.)

FOR INFORMATION, CONTACT:

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Jamaica, N.Y. 11423

JONATHAN GREEN & SONS
Farmingdale, N.J. 07727

NORTHRUP, KING & CO., Inc.
Minneapolis, Minn. 55413

VAUGHAN-JACKLIN CORP.
Bound Brook, N.J. 08805 • Downers Grove, Ill. 60515

Canadian Inquiries: **National-NK Seeds Ltd.**, Box 485, Kitchener, Ont. • **Rothwell Seeds Ltd.**, Box 511, Lindsay, Ont.
Other International Inquiries: **Northrup, King & Co., Inc.**, Minneapolis, Minn. 55413

BUYING AUTOMATIC IRRIGATION

Greens are lush at Columbus Country Club in Ohio since the installation of a new irrigation system.

After 44 years with the same irrigation system, the Columbus Country Club decided to replace it. Here, Superintendent Steven Kennedy tells how he went about doing so and offers some advice to superintendents who plan to replace their systems.

Once the decision to replace our irrigation system had been made, I took my notepad and camera and began traveling. I visited about 15 courses, studying their systems and asking questions. Generally everyone said they liked their present systems but when I asked about the kinds of problems they had, few would answer.

The difficulty was that very few people will admit to having made a mistake. Nevertheless, an educated eye can spot trouble. I also walked around the maintenance buildings. If there were sprinkler parts there, it was an indication the system was not quite as good as it could be.

After the visits, I started investigating product lines. I looked at everyone's product carefully. I recommend taking them apart, watching them in operation, timing them to see which ones are accurate. This is the superintendent's job. He is the one who is going to have to live with the system.

Check to see if the system is easy to repair. Compare your replacement part availability and the cost of replacement. If the superintendent is not involved in the decision as to which system to purchase, I believe the club is making a big mistake.

Installation is all important. If the system isn't put in right, you're just kidding yourself. Many superintendents told me equipment is comparable but the installation makes the difference. If an installer won't give you a list of all of the jobs he's

Continued on Page 18

"THE RIGHT APPROACH" TO GOOD TURF
CHIPCO TURF HERBICIDE MCPP
CHIPCO TURF HERBICIDE MCPP
NET CONTENTS 5 GALLONS
CAUTION: Keep Out of Reach of Children
"THE RIGHT APPROACH" TO GOOD TURF
CHIPCO TURF HERBICIDE "D"
CHIPCO TURF HERBICIDE "D"
For control of broadleaf weeds in turf, including golf courses, park grounds, and other non-crop turf areas.
NET CONTENTS 5 GALLONS
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CHIPCO THIRAM 75
CHIPCO THIRAM 75
TURF FUNGICIDE
CAUTION:
CHIPCO SPOT KLEEN
CHIPCO SPOT KLEEN
"THE RIGHT APPROACH" TO GOOD TURF
CHIPCO TURF KLEEN
CHIPCO TURF KLEEN
CAUTION: Keep Out of Reach of Children
Do NOT Store with Foodstuffs
"THE RIGHT APPROACH" TO GOOD TURF
CHIPCO BUCTRIL
CHIPCO BUCTRIL
For the Control of Certain Broadleaf Weeds in Newly Planted Grasses for Sod or Seed Production
NET CONTENTS 5 GALLONS
CAUTION: Keep Out of Reach of Children
Do NOT Store with Foodstuffs
DO NOT USE, POUR, SPILL, OR STORE NEAR HEAT OR OPEN FLAME
CHIPCO SPREADER-ACTIVATOR
CHIPCO SPREADER-ACTIVATOR
FOR TURF and ORNAMENTAL SPRAYS
CAUTION:
"THE RIGHT APPROACH" TO GOOD TURF
CHIPCO MICROGREEN LIQUID
CHIPCO MICROGREEN LIQUID
A blend of metal organo complexes of iron, zinc, manganese, and copper for the correction of turf nutritional deficiencies
NET CONTENTS 5 GALLONS
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Chipco Turf Kleen is a broad spectrum herbicide that controls broadleaf and surface creeping weeds with a wide margin of safety around trees and shrubs.

Chipco Spot Kleen is a systemic fungicide for control of dollar spot, Fusarium blight, stripe smut, large brown patch and copper spot.

Chipco Thiram 75 prevents and controls snow mold, large brown patch and dollar spot. Used with Spot Kleen, it offers a complete disease control program.

Chipco Microgreen Liquid prevents chlorosis which results in long lasting deep green color, more root growth and less desiccation.

Chipco Turf Herbicide D is a general purpose broadleaf herbicide ideally suited where economical control is desired.

Chipco Spreader Activator is a quality adjuvant to increase the efficiency and effectiveness of turf chemicals.

Chipco Crab Kleen gives economical and selective post-emergence control of crab grass, chickweed and other grassy weeds in established turf.

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Rhodia Inc., Agricultural Division, Monmouth Junction, New Jersey 08852

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BUYING AUTOMATIC IRRIGATION

Continued from Page 15

done or won't take you to see jobs he has done, don't use him. Always check his reputation.

Another recommendation is to check your mains. Ours are cast iron. I had two engineers verify their condition before installation. Your new system won't be successful if your mains aren't good.

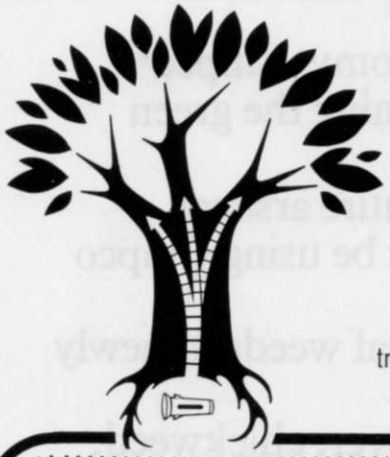
Once we had made our decision to go with a RainBird system and selected our installer, everyone was pleased with the results. The pipe was pulled about 18 to 24 inches underground with a vibratory plow with no trenching. We played all four rounds of our club championship while the work was being done without a single complaint.

Our greens are small and I decided to go with two heads in front and two in the back for each valve. You can literally do anything you want with automatic irrigation but if you get too complex you are just defeating your purpose.

Also in the new installation consider snap valves. We put in a snap valve at each green. This fall we planted 145 trees. They need water and now it is readily available. The valves are covered with a valve box that can be opened with a special tool quite easily but is otherwise tamper-proof.

Once your system has been customized to suit your needs and installation is completed, you should have a system you can be proud of. And one that makes your job easier. □

Steven Kennedy presented this report at the Ohio Turfgrass Conference and Show Dec. 8, in Columbus. More than 1200 people attended this most successful conference. WEEDS TREES & TURF will be publishing more topics covered at the conference in later editions.



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FREMONT, NEBR., Tues., Feb. 8 Holiday Lodge		
ST. LOUIS, MO., Thurs., Feb. 10 Holiday Inn—Riverfront		
MILWAUKEE, WISC., Fri., Feb. 25 Hoffman House, 251 N. Mayfair Rd.		
ELMHURST, ILL., Tues., March 8 Holiday Inn, 624 N. York Rd.		
CHAMPAIGN, ILL., Fri., Feb. 11 Ramada Inn—University		
MOLINE, ILL., Thurs., Feb. 24 Holiday Inn—Airport		
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*For a free copy of a University study on nitrogen return, contact FMC Corporation, Port Washington, Wisconsin 53074.

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A PULLED PIPE SYSTEM FOR DRAINAGE

The author, Don Davison, is an irrigation contractor in Cleveland, Ohio.

Too much — too little — too late — These are the three big moisture problems which must be solved to acquire healthy plants through proper root structure.

As an irrigation contractor for over 13 years, Irrigation Supply has installed a great number of sprinkling systems to correct the latter two problems in lawns, shrub bed areas, cemeteries, golf courses, baseball and football fields, and wherever the lack of moisture was the basic problem. After some years, it became apparent that the first problem — too much — was far more important and of greater concern than the combination of the other two.

The supplying of adequate moisture to dry areas is purely academic and can be resolved by installing an engineered sprinkling system. However, the residual water from sprinkling, often supplemented by rainfall, will find isolated low areas and proper drainage of those areas must be provided if the plants are to survive.

Through a vast amount of research, plus trial and error with a large number of differing sizes and styles of drainage systems, we determined that a one inch plastic pipe, with quarter inch holes drilled every 6 inches throughout the length, was part of the answer to this problem. We designed the tools with which to install this pipe and have made a multitude of installations during these past five years.

The vibratory plow, which we designed to pull the pipe through the soil at the desired depth of from 4 to 7 inches, is hydraulically controlled to conform to the contour of the terrain and achieve proper drainage. The right depth is determined by sampling to learn the composition of the soil and root structure.

The plow, attached to the machine by a cutter shaft, is hydraulically inserted into the soil to the desired depth before it is caused to vibrate. This vibration compacts a one and a half inch tunnel into which the pipe is pulled by a 'Chinese Finger' attached to a hook on the plow, and it also shatters the soil to a radius of several feet from the plow.

On the surface, the only visible evidence of the installation is a small cut, approximately a quarter inch wide which will disappear after several waterings. But if immediate use without visible evidence of the installation is desired, the small slit can be dressed with course silica sand or other material.

One installation of interest might be the 13th green on the golf course of the Chagrin Valley Country Club. This green is in front of and at the base of a cliff-like rock area from which water would weep for several days following a heavy rainfall. During such periods, the green was either out of play or used only by those who were seriously devoted to the pleasures of golf.

Many plans to correct the problem were considered and discarded, since trenching and installation of conventional drain tile

would have required several days. Instant Drainage was suggested and adopted.

Installation was started at 10 a.m. and just three and a half hours later the green was back in play. It has not been out of play since then due to excess water.

The initial root structure was measured at two and a half inches, and just three months later had deepened to four and three quarter inches. We have subsequently and successfully drained fairways and other problem areas on their course.

We have designed various attachments for our vibratory plows to enable the installation of the one inch pipe with a minimum of lawn damage and without digging. By using this size of pipe, we avoid mounding and install it to whatever depth is dictated by the desired root structure, usually just where the topsoil joins the clay or other subsurface material.

Not only does this drain off the excess surface, water, instantly, but it also aids in the aerification of the soil, and it retards the compaction of the surface in heavily traveled wet areas. In addition, although the pipe has a positive siphonic action, it still retains enough subsurface moisture for root consumption as needed, thus making for a deeper and heavier root structure and healthier plants.

The twenty foot long sections of pipe are permanently bonded together to form whatever continuous lengths are required. We can pull a thousand feet of continuous length in compatible soil, and have installed 5,000 feet of pipe in a day using one machine and an operator.

Over a given area, we will install a greater quantity of Instant Drainage than is normal with four inch pipe, and this permits a greater percolation of water through the soil. Wet areas in which we have compacted tunnels only, without the installation of pipe, have retained their inch and a half of compacted tunneling for several years.

Examination of 5-year-old installations of Instant Drainage reveals that the pipe is still clean, free of debris, and functioning well. Installation in sandy soil assures that soluble salts in the air can be washed away from the root structure of the grass and/or plants and thereby provide stronger growth.

We recently installed 20,000 feet of Instant Drainage at Cleveland Stadium, which has four season use as the home of a football and a baseball team. The field of this stadium is reportedly fifteen feet below grade and would remain very wet for several days after a downpour. Before the installation was completed, we were visited by a wet weekend during which almost 5 inches of rain fell throughout the area by Sunday evening. At 9 a.m. Monday morning, the field was wet, but by 1:30 p.m. that same afternoon, the field was dry. □

Installation in progress at Cleveland Stadium.

GCSAA SHOW PREVIEW

a week in Portland

The Pacific Northwest is the site for the 48th International Turfgrass Conference and Show, sponsored by the Golf Course Superintendents Association of America, Feb. 6-11 in Portland, Ore.

Over 5000 GCSAA members, exhibitors and speakers and representatives from allied associations, government, industry and education are expected to attend the Conference and Show in Portland's Memorial Coliseum.

This year more than 150 manufacturers and distributors attending the show will be allowed to take orders for their products as a result of the tax reform bill signed by the President. Prior to the signing exhibitors had been limited to displaying their products: order taking and floor sales were prohibited because of GCSAA's non-profit status.

Exhibits of turfgrass equipment and supplies will occupy 100,800 square feet of floor space at the Coliseum. Monday, Feb. 7, will be Distributor's Day. From noon until 5 p.m., manufacturers can show their exhibits to their dealers before the show opens to the public.

The exhibit hall will be open Tuesday and Wednesday, Feb. 8 and 9, from 9 a.m. to 5 p.m. and Thursday, Feb. 10, from 9 a.m. to 4 p.m. Tuesday, the opening day, traditionally has been reserved for superintendents only to view the show.

The continuous educational seminars with the trade exhibits are designed to familiarize superintendents with new methods, products and equipment that can contribute to improved and more efficient golf course maintenance practices. □

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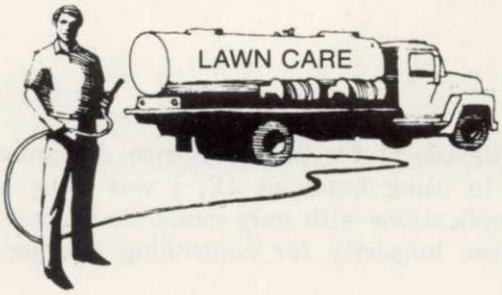

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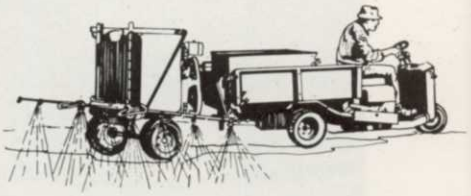

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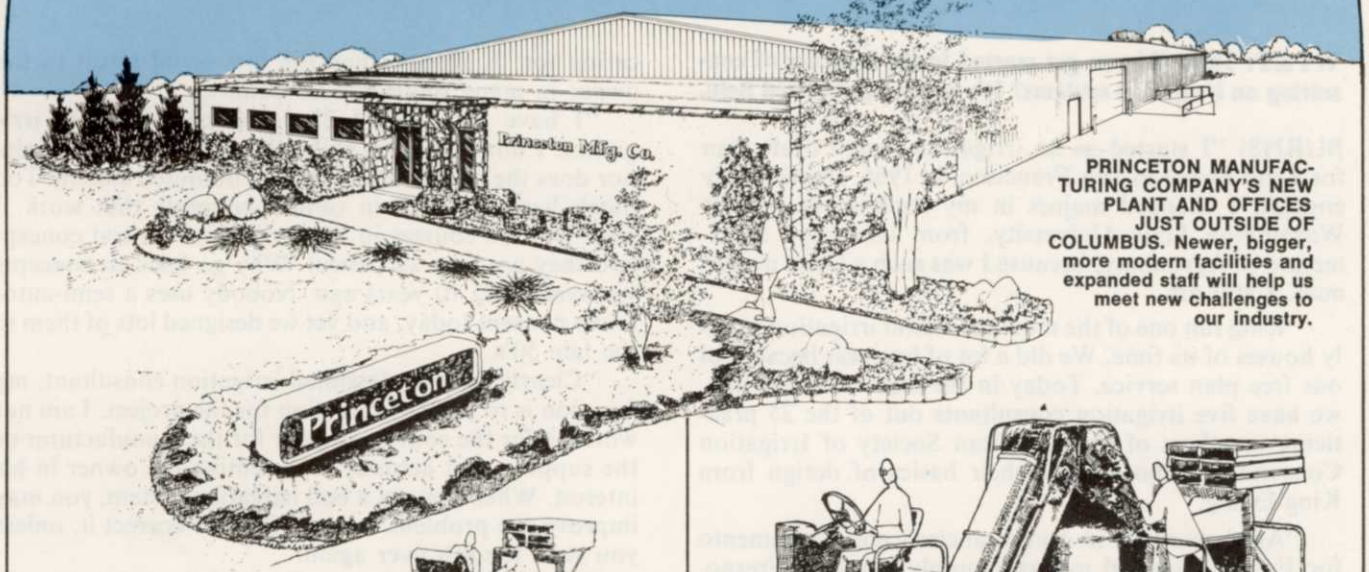

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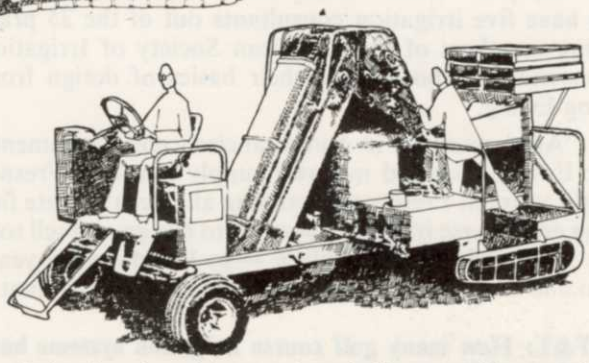

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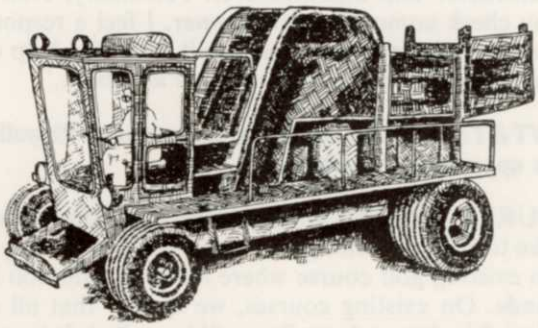

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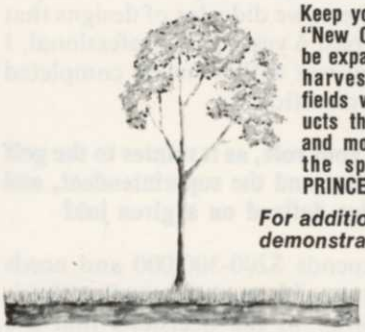

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THE METICULOUS CONSULTANT

Don Burns is a specialist by trade, and a perfectionist by nature. Through constant and often critical self-analysis, he has developed a modus operandi for designing irrigation systems which combines scientific thoroughness with the determination to excell.

WT&T: How did you get started in the business of consulting on irrigation systems? It's a very specialized field.

BURNS: "I started as an irrigation design draftsman for King Ewing in San Francisco, in 1956. Interestingly enough, I changed majors in my sophomore year at Washington State University, from landscape architecture to Agronomy, because I was such a lousy draftsman. I still am.

"King ran one of the most successful irrigation supply houses of its time. We did a lot of business because of our free plan service. Today in the State of California, we have five irrigation consultants out of the 25 practicing members of the American Society of Irrigation Consultants, who learned their basics of design from King Ewing.

"After working in San Francisco and Sacramento for Ewing, I started my own supply house in Fresno. Eight years in Fresno and running all over the state finding golf course irrigation systems to design and sell told me I wasn't in the right place — so I sold out six years ago and moved to La Jolla as an irrigation consultant."

WT&T: How many golf course irrigation systems have you designed?

BURNS: "I'm sure over the past 21 years, I've designed well over 300 golf course irrigation systems — maybe more. In the supply business, we did a lot of designs that weren't installed. In the past 6 years as a professional, I have designed over 80 courses with some 50 completed and installed under our direction."

WT&T: How do you see your role, as it relates to the golf course owner, the contractor and the superintendent, and how are these relationships defined on a given job?

BURNS: "The owner spends $200-300,000 and needs one person to act as a responsible party or as an authority and represent the owner in the decisions that are needed in such a large expenditure. Generally, the superintendent is not going to take that kind of responsibility. While my academic background may be strong in turf management, I would not take the responsibility of caring for 18 greens when the loss could result to the owner in many thousands of dollars.

"I have had almost 22 years' experience in irrigation. I don't need to make the same mistakes again, nor does the owner need to get an outdated system. Too much has happened in central concepts that work. I have over 60 courses in the ground on central concept and they are very successful. Why go back to concepts we were using 10 years ago. Nobody uses a semi-automatic concept today, and yet we designed lots of them in the late 50's.

"Clearly, as a professional irrigation consultant, my function is to provide direction for the project. I am not working for the contractor, nor for the manufacturer or the supplier, but actually representing the owner in his interest. When you get a bad irrigation system, you may improve the problem, but you'll never correct it, unless you start the job over again.

"I would group the supplier and the contractor together, because the contractor, like it or not, is responsible to the owner for the equipment he installs. The relationship between the contractor and his supplier must be good for all concerned. Our specifications call for contractor responsibility and supplier responsibility. This is intended to get the service thing started right.

"Our position is to represent the owner, but you can see we sit somewhere in the middle when it comes to what's fair for all parties — owner-superintendent-contractor and manufacturer. Personally, even though my check comes from the owner, I feel a responsibility to all these parties — because it takes the help of all to get a good job. That's what it's all about."

WT&T: What has been your experience with pulling pipe as opposed to trenching?

BURNS: "I find it different with each contractor. Some like to pull everything they can — most will only pull on an existing golf course where a new installation is being made. On existing courses, we specify that all existing pipe, 2 inches and smaller, will be pulled. It is much less damaging to the course, and allows play to continue during the installation.

"On new golf courses, where the trench is not tearing

up anything, I find that most contractors would rather trench and backfill.

"Pulling pipe is here to stay, even on a course where rocks may be of concern. The chance of damaging the pipe during the pulling operation is worth it in comparison to the additional cost of open trenching and expensive backfill. Plus, there is a loss of revenue to clubs for closing holes when there are a lot of trenches open. This does not occur when pulling, because it's a much cleaner operation."

WT&T: To what extent have you used effluent water and how do you see the future of this type of usage?

BURNS: We are using effluent water on two jobs right now — the Royal Kaonapali in Maui and the New Molakai Beach course in Molakai. I feel we really should be considering using this water all over the world and not losing it by dumping it into the oceans and rivers. It has an ecological value in conservation and has added nutrition for plant life.

"Not all effluent water is usable, but if we can generalize, I would answer as above. If you are going to use effluent water, you must consider two points — (1) the quality of the original water sources; and (2) the renovation treatment. The dissolved salt content, the sodium absorption ratio which reduces soil peremability, the trace elements which are potentially toxic, the chlorine content, and, if course, the biological composition for health reasons.

I would recommend an analysis be made on any water from a soil and water testing laboratory."

WT&T: How about drip irrigation?

BURNS: "Our only use of drip irrigation has been as additional water for trees. It is very important in the desert that trees get more water than just that offered by the irrigation system. We run a manual system off the main with tubing supplying an emitter at each side of the tree. It has been very effective and inexpensive to install. The tubing can be pulled shallow after the trees are planted."

WT&T: You seem to be a perfectionist in your design. It must be difficult to work with a contractor who feels the urgency of getting a job done more poignantly than the need for farsighted design.

BURNS: "I don't feel many contractors will try to cheat, if the contract is reasonable. It must be fair for both the owner and the contractor. If the contractor is losing money, he will try to make it up.

"A contractor who specializes in golf course irrigation usually is pretty set in his thoughts of what is a good irrigation system. He's usually pretty proud of his job record. I don't always agree with his concepts but we do find that in the end an agreement is made to the benefit of the owner. I try to help the contractor so he will help me — it gives the owner more for his money."

WT&T: Can you explain why your approach to irrigation design is different from the other 25 consultants in California?

BURNS: "In the first place, 95 percent of our work is golf course irrigation, which separates most of us. Of those who do do golf course irrigation, very few will do their own staking. After the normal preliminary and final design with complete sets of specifications and details, as performed by all irrigation consultants, our scope of work differs in that it extends to total responsibility of staking of all sprinkler heads, valves, and controllers. This personal staking allows changes in head location and programming of heads due to: construction changes, site conditions or contours, wind and soil conditions, and existing trees, sand traps, or cart paths.

"Following this staking, we must do another plan because of the changes. This plan becomes an 'As Staked Drawing' and is the guideline for the contractor during installation. When the contractor completes this phase of the installation, we do another drawing showing all corrections and changes in pipe and valve locations for a final 'As Built Drawing.'

"In the end, this means we made three drawings of each area and walked the same fairway four different times:

(1) during staking
(2) doing the 'As Staked Drawing'
(3) while checking the 'As Staked' for corrections
(4) a final walk-through with the 'As Built' drawing with the superintendent and contractor for check list to sell job.

"This involves over 30 days, or parts of days, on a site, over a period of 4 to 6 months. This is a lot of time on-site, but I know of no other way to assure the owner he is getting the best possible job."

WT&T: Is business competitive among irrigation consultants?

BURNS: "Generally I am competing with two or three other consultants and price doesn't necessarily determine how the owner makes his selection. Rather, the scope of work of a consultant and his past experience are the major factors. The selection of a consultant should be made independent of manufacturer or supplier presentations. There are two things you must get across to the owner and superintendent, when making your presentation: (1) you don't really care what brand of equipment they use, as long as two brands are

THE METICULOUS CONSULTANT

listed (I think it important that competition be involved in the equipment); and (2) you are open to their concepts of design as long as they will let you express your experience on your own concepts of design, and together come to a mutual acceptance.

"There are things I won't do and if I feel they are really wrong, I politely say I don't think they need me. If they have made a decision on a direction and it is not in agreement with what I know to be good practice, sometimes I have to allow them to go ahead and make their mistakes because they are paying the bills."

WT&T: Your design concepts are rather technical. Have you encountered any difficulties in presenting your ideas to owners and superintendents?

BURNS: "I try to cover this in making the client understand what C.U. means. C.U. means the Co-efficient of Uniformity, which is a percentage figure, derived from the precipitation rates at various points of one sprinkler to another, totaled together and averaged out giving the efficiency of coverage.

"One thing I work on the hardest is a high C.U., and this comes only with the use of the right head at the right spacing. We use two size heads to accomplish this; to make the two areas fit together, one to the other, takes two size sprinklers. It is not possible to hold to a total equilateral triangular spacing like many plans are drawn. Drawing circles on a flat piece of paper is not the same as staking to site conditions. Our 'as staked' drawings relate to a custom design to the site conditions.

"One thing we will not tolerate is, if we are on a basically 70 foot spacing, and we jam heads in to make it cover where some heads are on 40 feet and some on 70 feet and some on 75 feet. We have destroyed the C.U. in this area obviously creating a wet spot or dry area. This must be corrected during staking. By using two sizes of sprinkler heads, it is possible. It is important that you understand the need to make the spacing correct all the way through.

"Back to the question, it's very hard to present these concepts, but it's a lot easier and a lot more understandable when you visit an existing job and see the heads in operation. In addition to the correct spacing, I feel our most important job is in establishing proper programming, often referred to as the heart beat of the system. Custom programming to conditions as found on site means programming to the drainage or contours as they are found on site.

"I am a total believer in the Master Central Controller concept. I have been responsible for over 75 installations of this type, and when properly used, they save labor, money in the waste of fertilizer and water, and improve the conditions of play by preventing wet spots and over-watering."

WT&T: I realize that this may be academic, but can you explain how you evaluate the irrigation needs of a particular site.

BURNS: "Prior to design, we make a site visit for survey of (1) terrain; (2) soil; (3) water availability and requirements; (4) wind and how constant it is; then we follow this all up with input from the superintendent. We ask him to give us: programming time; number of hours we can water at night; and the spacing that he would like. Next I ask very pointed questions as to the supplier in the area who offers the best service. Then I ask what they expect the cost of the system to be. From this data, we do a preliminary design.

"A meeting is again held on site with the owner and the superintendent to go over these concepts and expected costs. From the feedback of this meeting, a final design is made with a complete set of specifications and details of the pumping plants.

"Variables that distinguish one design from another are: (1) owners' requirements — type of system, budget, how many hours we can operate per night, and how much water is required (1 inch a week, 1½ inches a week, etc.); (2) wind conditions — the head location must be in relation to the normal wind current; (3) soil conditions — heavy soil must have more control because wet spots will result if you aren't controlling the area (sandy soil has little or no lateral water movement so that consistent spacing is critical); (4) water supply — pump control, clean or dirty water, and whether we have to put up some sort of sand separation or purifying plant. Obviously all these things are going to make for extreme cost differences.

"We worked on contracts last year with a low of $180,000 for 18 holes, and a high of $520,000 on 18 holes.

"We are working on our eighth golf course in Hawaii and the high cost still amazes me. Next year we will be bidding on a job in 100 percent total lava. I'm still unsure of its cost or exactly how we're going to do it. This year we worked on Honolulu International Country Club. The total cost of the golf course, alone, is going to exceed $12 million. They actually filled a lake to create the land.

"We are completing two other projects at this time — one is Oahu Country Club, which has a rainfall of 180 inches, and the other is Molakai Beach, with an average rainfall of less than 12 inches."

Every job is difficult in some way. Our concepts are always changing. We hope with improvements in equipment, they will continue to change.

WT&T: Where do you think the decision-making input should come from when specifying for designing an irrigation system?

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BURNS: "The superintendent should have the most to say. If he is qualified, he should get what he wants, within reason.

"I would prefer to interview for a job on a design basis, meaning, if an owner would give some nominal cost, have two or three consultants present a design on the same fairway and explain concepts and why."

WT&T: Is your system dependent upon any particular line of products, or are you personally committed to any one manufacturer?

BURNS: "No and I always ask for more than one brand be listed for competitive bidding. If the owner is satisfied he wants only one brand because of past relationship, I ask that the equipment price be negotiated as the contractor price is negotiated.

"Being in the supply business in past years myself, obviously I have a lot of understanding of pricing as to what is fair, and where a negotiated figure should be.

"I honestly don't feel any one manufacturer has an advantage over another. I do feel one supplier over another is important. The service of the supply house is what we leave with the owner after the job is completed.

"Every manufacturer would like the designer to give him an advantage, but I think most manufacturers would rather see an equal shot for his products than be left out. This past year, I was commissioned for several designs by the manufacturers directly, (as a service for that manufacturer), by three of the four major irrigation equipment manufacturers. I feel this speaks highly for our independence."

WT&T: Does every golf course need an irrigation system which is as elaborate as the systems which you design?

BURNS: "No, but I disagree strongly on some of the jobs I see go in, especially in areas where irrigation becomes somewhat supplemental. The Midwest and Eastern States can get away with more inadequacies because rain covers up mistakes. Most of my work has been in the Southwestern United States and the State of Hawaii, but I continually run across work or re-do work that would not have cost any more if it had been done right the first time." □

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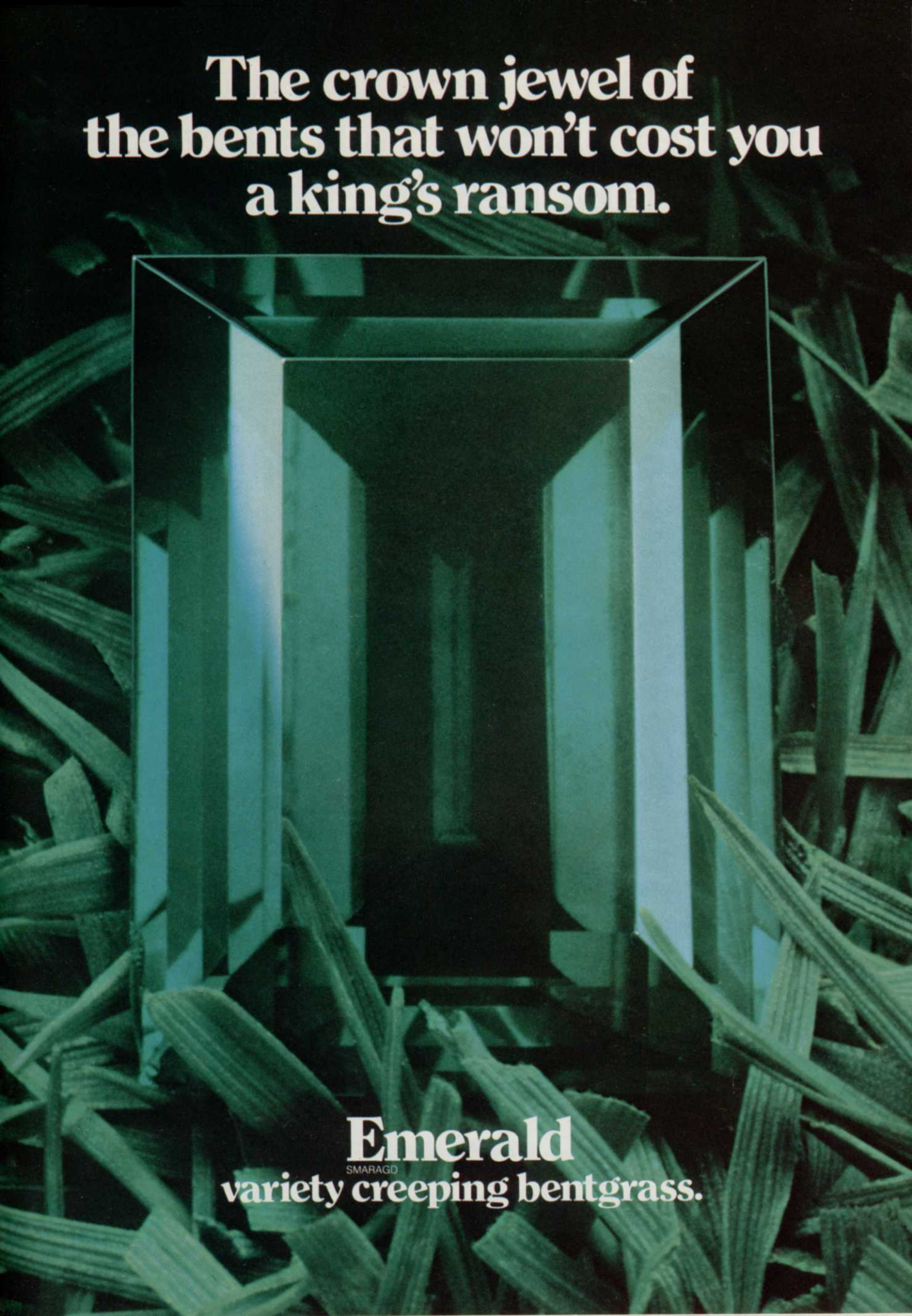
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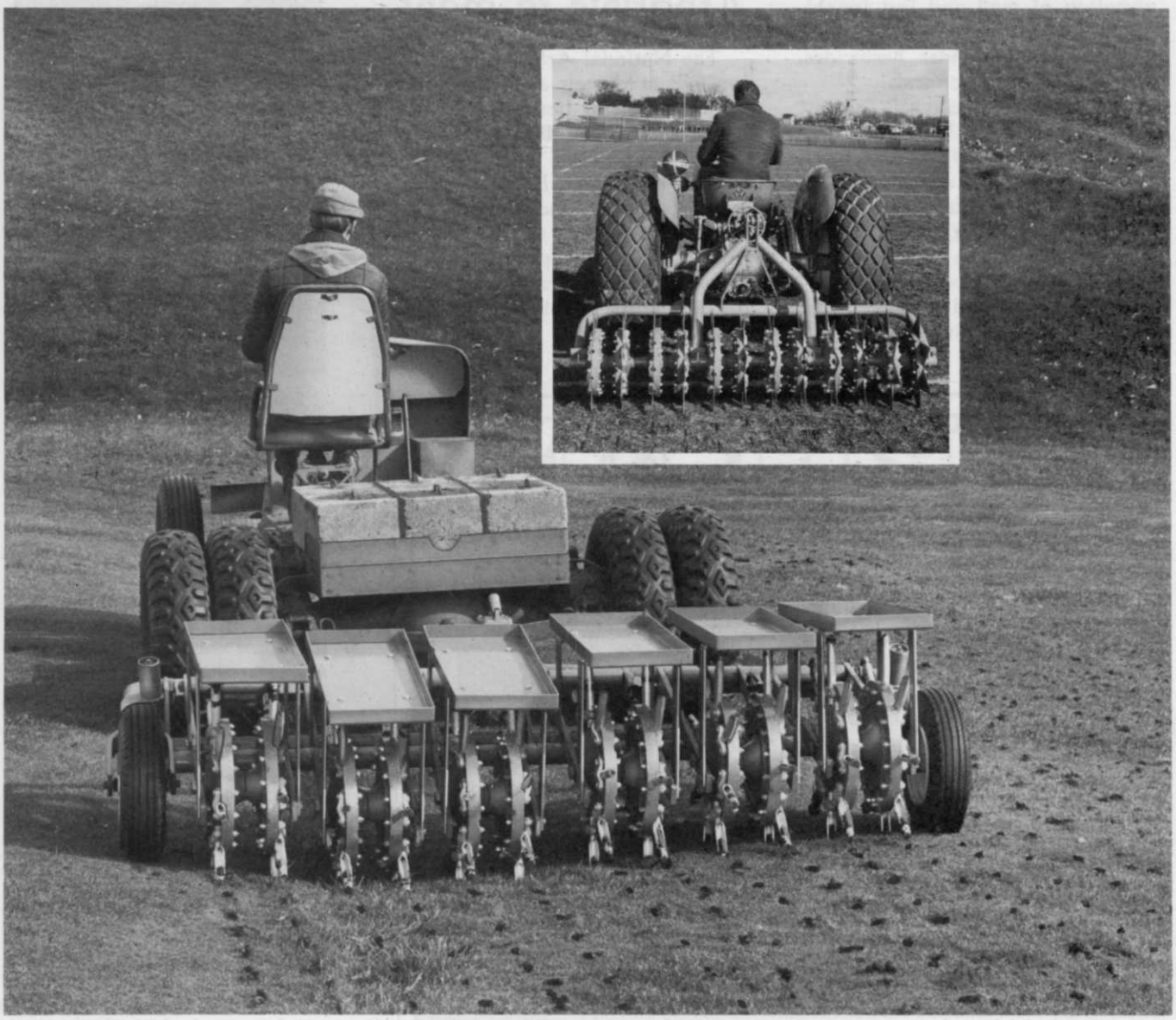

Researchers tell story of aerial application

The Wright Brothers really started something in 1903 according to Connie J. Streeter and Dr. Orvin Burnside, weed scientists at the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources.

The UN-L researchers, reporting at the 1976 North Central Weed Control Conference held here Dec. 7-9, said the Wrights' airplane flight at Kittyhawk, N.C., has been followed by the use of aircraft for sport, transportation, war, transportation of mail and fast freight. More recently, planes have been used to apply pesticides, herbicides, and fire fighting chemicals.

The first use of aircraft for pest control occurred in 1922 when they were used for dusting catalpa trees. Militaryu aircraft were used because of their availability and the military did much experimentation in that era to aid the agricultural industry, the Nebraskans explained.

Ms. Streeter said that later outbreaks of the cotton boll weevil, locusts, and other devastating insect pl/gues did much to spur the development of th aerial applic/-tion industry. Other successful agricultural uses for aircraft came into use such as sowing seed, fighting forest fires, and the application of herbicides. Helicopters as well as fixed-wing aircraft have become important in the aerial application industry since about 1946.

Arborists to meet

The National Arborist Association will hold their annual meeting at the Don CeSar Beach Resort Hotel, St. Petersburg Beach, Florida, Feb. 13-17.

Robert Lederer, Executive Vice-President of the American Association of Nurserymen will be the featured speaker in a program which will explore avenues for environmental improvement and beautification.

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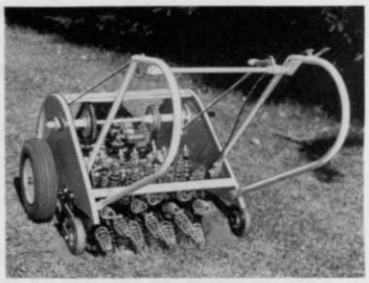

Hahn MC-5C Vertifier

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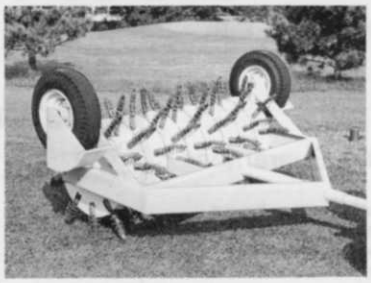

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U.S. pesticide consumption rate slows down

U.S. consumption of synthetic organic pesticides increased at an annual rate of nine percent between 1970-1975, but a decrease in consumption is anticipated by 1980, reports Stanford Research Institute (SRI).

In a series of reports on pesticides published as part of SRI's Chemical Economics Handbook (CEH), domestic consumption, the Institute estimated, was 1.3 billion pounds last year and is expected to reach 1.5 billion pounds by 1980. This represents a slowing of the rate of consumption to an average two to four percent per year — primarily as a result of a leveling off of herbicide demand.

"Pesticides have emerged as a large, rapidly growing chemical industry, both domestically and abroad," says Jeanie Ayers, the primary author of the reports.

Herbicides and insecticides account for 68 percent of total pesticide consumption while fungicides are 19 percent and fumigants and nematicides are 13 percent.

Ayers says that herbicides and insecticides are expected to continue to dominate pesticide sales but growth is expected to decrease in some key agricultural markets. The outlook for the U.S. pesticide market depends on factors related primarily to the production of corn, cotton, deciduous fruits/nuts and soybeans.

The high degree of maturity of the herbicide and insecticide markets for corn and cotton and approaching maturity of the soybean herbicide market will see future consumption more sensitive to annual acreage fluctuation. Opportunities for foliar fungicide use in the soybean market are expected to develop into a growth market for these products.

SRI also predicted these developments:

—U.S. policies that will affect domestic and international agricultural commodity demands.

—Government regulation will continue to apply pressure against selective pesticides that are considered risks to health and safety.

—Marketing abilities of pesticide manufacturers will play an important role in the product mix of future pesticide consumption as competition increases in saturated markets and as key patent expirations encourage entry by new suppliers.

—International agricultural and pesticide policies will influence the volume and type of pesticide exports from the U.S.

The SRI Pesticide series is available as separate reports or as a complete 540-page series of five pesticides reports covering Fumigants and Nematicides, Fungicides, Herbicides, Insecticides, and a Pesticide Industry overview.

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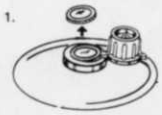

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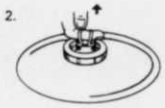

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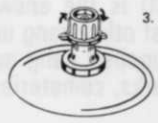

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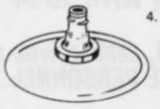

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Irrigation Field Storage Tanks (Fiberglass)
Sprayers: Complete power unit jet or mechanical agitation
Hopper-Spreader type (Fiberglass)
Custom production-Fiberglass items

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*Product	Movement in Soil	Control Annuals	Control Perennials	Comparative Longevity	Comparative Product Feature
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Monobor-Chlorate + Diuron (Weed and Grass Killer)	Low	Excellent	Good	Longer	Economical, double action, for sustained annual weed control.
Ureabor	High	Excellent	Excellent		Strong control of deep-rooted perennial weeds.
Borocil IV	High	Excellent	Excellent	Longest	Use where chlorates not desired.
Hibor C	High	Excellent	Excellent		Excellent for retreatment programs.

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BLACK CUTWORM CONTROL

by D. K. Pollet

As with many insects, the immature or larval stage of an insect is the most damaging. This is particularly true in the case of butterflies and moths, where the larval stage causes damage and the adult beautifies the surroundings with it's presence. One particular group of moth larvae, the cutworms, cause problems and sometimes severe damage to crops, vegetable plants, and turf.

Cutworms are a serious pest in the south on grasses on the home lawn as well as the golf course. They produce multiple generations each year and can be a problem from the time the weather warms up until it frosts in the fall.

The abundance of a given species of cutworms is greatly affected from year to year by rainfall conditions which may prevent the adult moths from laying their eggs or by flooding which will force the larvae to the surface where they become food for birds or other predatory insects or animals.

The cutworm overwinters in the larval or pupal stage although a few hibernate as adults in the soil or under trash or in clumps of grass. The larval stage burrows into the soil beneath the turf and comes out to feed at night. This cutworm is cosmopolitan and has a pernicious habit of cutting off several plants while satisfying it's appetite.

Their eggs are laid singly and occasionally two or three together on the blades and stems of the turf. The larva is a greasy gray to dark

Continued on page 44

Evaluation of New and Standard Materials for the Control of Black Cutworms on Bent Green Putting Surfaces[1]

Turf Varieties	Seaside				Emerald			
Count[2] Interval Hours	0[3]	24	48	120	0	24	48	120
Treatment[4]/Rate								
Proxol 80SP 3 oz/1000 sq. ft.	5	0	0	0	6	0	0	0
Dursban 2E 1.5 oz/1000 sq. ft.	8	0	0	0	13	0	0	0
Velsicol 4283-4EC 1 lb ai/A	7	2	1	1	6	5	2	0
Velsicol 4283-4EC 3 lb ai/A	3	0	0	0	11	0	0	0
Velsicol 3883-90WP 1 lb.ai/A	9	0	0	0	5	0	0	0
Velsicol 3883-90WP 3 lb ai/A	7	1	0	1	7	0	0	0
Diazinon 8 oz/1000	9	0	0	0	7	0	0	0
Proxol 80SP + Tuco S8314 3 oz/1000 + 1 pt/100	2	0	0	0	5	0	0	0
Dursban 2E + Tuco S8314 1.5 oz/1000 + 1 pt/100	2	0	0	0	4	0	0	0
Orthene 75S 2.5 lb ai/A	3	1	0	0	5	2	0	0
Orthene 75S 7.5 lb ai/A	7	1	0	0	5	0	0	0
U.C. 51762-75WP 0.5 lb ai/A	8	0	0	0	10	0	0	0
U.C. 51762-75WP 1.0 lb ai/A	9	0	0	0	6	0	0	0
Dursban Plus 3 oz/1000	5	0	0	0	6	0	0	0
Control (water only)	9	5	4	6	4	7	5	12

[1]Plots — 90 sq. ft. each
[2]Counts — each represents a total of 2 — 1 sq. ft. areas
[3]Counts made with use of Diagnostic aid 8/18/76
[4]Plots were treated with 1.5 gallons water, applied by hand — one application

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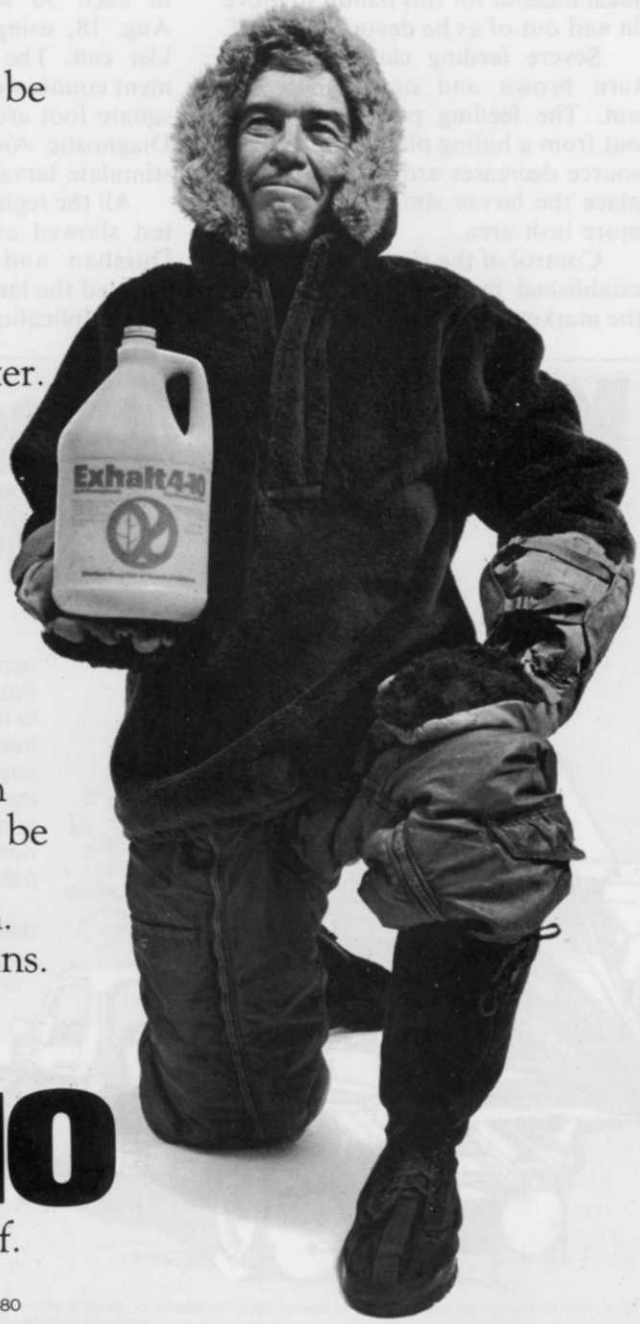

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BLACK CUTWORM CONTROL

Continued from page 42

brown and occasionally black color with faint stripes.

The black cutworm takes advantage of the cultural practice of aeration of golf greens. A course may not have a bad cutworm infestation, but as soon as the greens are aerated in come the cutworms. These little aeration holes or pockets make an ideal hideout for this bandit to move in and out of as he devours the turf.

Severe feeding causes areas to turn brown and occasionally die out. The feeding patterns radiates out from a hiding place. As the food source decreases around one hiding place the larvae simply moves to a more lush area.

Control of the cutworm has been established by several materials on the market: Dursban, Dursban Plus, Diazinon, Proxol, Dylox and Sevin. In addition to these, new materials coming on the market show good cutworm control potential.

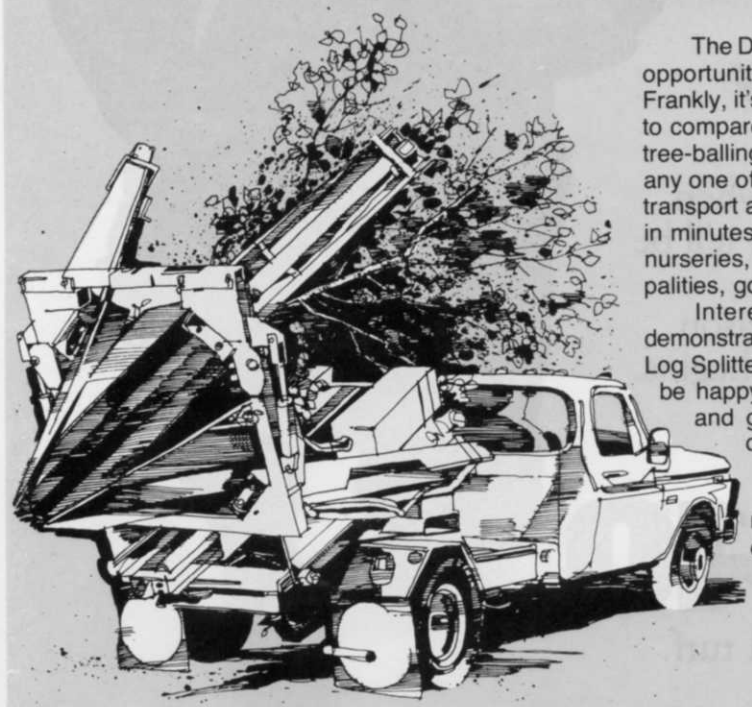
These tests were made on bent green varieties Seaside and Emerald at the turf plots on the Simpson Experiment Station in Clemson. A single application was made by had to each 90 square foot plot on Aug. 18, using a 1.5 gallon sprinkler can. The pre and post treatment counts were made on two one-square foot areas in each plot using Diagnostic Aid as an adjuvant to stimulate larval movement.

All the registered materials in the test showed excellent control. The Dursban and Proxol treatments agitated the larva within 15 minutes after application as they were noted squirming on the surface. Orthene 75S and U.C. 51762-75WP showed good and consistent control of the larvae. The Velsicol materials Vel-4283-4EC and Vel-3883-90WP were a little erratic but did give good control. In no instance did any of the materials cause any phytotoxic symptoms on the plots.

Between the materials on the market and the new materials coming, cutworm control as well as other turf pest, should be no problem on the golf course or in the yard providing the applicator uses the materials properly. □

D. K. Pollet is an assistant professor of entomology with Clemson University College of Agricultural Sciences.

We demonstrate. You calculate.



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From the campus

Scientist's device measures nitrogen loss

Agricultural scientists in the past reported substantial volatalization losses of nitrogen from surface-applied urea. But 1976 studies conducted by Dr. David E. Kissel of Texas A&M University, utilizing a new collection device he designed, indicate some former test conclusions may be wrong.

Experiments carried out by Dr. Kissel in 1974 and 1975, using traditional methods, confirmed earlier nitrogen volatilization loss data. Dr. Kissel, however, was not satisfied that measuring techniques were appropriate for natural field conditions. In fact, he noted that the traditional measuring equipment actually created an artificially adverse environment that greatly induced nitrogen volatilization readings.

During the winter of 1975, Dr. Kissel, working closely with Texas A&M and U.S. Department of Agriculture engineers, developed an accurate new collection device that would not create conditions of artificial temperature, relative humidity and soil water content. He believed these conditions were responsible for limiting reliability of previous data.

Then in 1976, he conducted a series of experiments on coastal bermudagrass sod using his new measuring device, which did indeed confirm his opinion that some earlier volatilization data had been incorrect.

At application rates ranging from 50 to 400 pounds of actual nitrogen per acre, Dr. Kissel was unable to measure greater than a 3 percent loss of nitrogen from any treatment, and that occurred only at the 50-pound per acre application level. Losses of only one, 0.5 and one percent respectively, were measured at the 100, 200 and 400 pound application rate levels. Calcium nitrate, dry urea, Uran nitrogen solution spray and uran applied in narrow bands on the soil surface were tested. Dr. Kissel said the average of test results for two seasons indicated nitrogen uptake by the crop was "close to the same for all N sources."

"Because this conflicted with the previous data," Dr. Kissel explained, "we then recreated the experiment in the laboratory using former equipment, and found that our volatilization losses ranged as high as 39 percent."

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Robert W. Hope
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For ad on following page circle 118 on free information card

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A.

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The New Ditch Witch C

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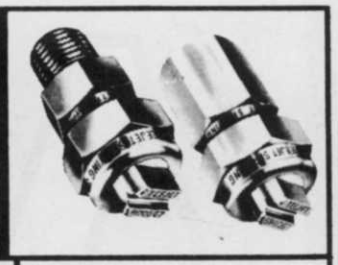

Over 800 INTERCHANGEABLE SPRAY TIP TYPES AND CAPACITIES... tapered edge, even and wide angle flat spray ... hollow and full cone ... disc type hollow and full cone ... and flow regulators. The most complete line for spraying herbicides, insecticides, fungicides, liquid fertilizers and foam solutions. All materials. *For complete information write for Catalog 36 ... and for foam spraying ask for Data Sheets 13602 and 13626.*

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Meeting Dates

Mid-Atlantic Nurserymen's Trade Show, Hunt Valley Inn, Cockeysville, Md., Jan. 17-19.

Pennsylvania State University Turfgrass Conference, Keller Conference Center, University Park, Pa., Jan. 17-20.

Landscape Ontario Congress, Sheraton Centre Hotel, Toronto, Ont., Canada, Jan. 18-20.

International Florist, Growers and Nurserymen Trade Show, Civic Center, El Pase, Tex., Jan. 23-25.

Associated Landscape Contractors of America Trade Exhibit and Annual Meeting, Riviera Resort Hotel, Palm Springs, Calif., Jan. 23-28.

Colorado Nurserymen's Association and the Rocky Mountain Chapter of the International Society of Arboriculture, Colorado Nursery and Shade Tree Conference, Denver Merchandise Mart, Denver, Col., Jan. 31-Feb. 2.

International Society of Arboriculture, Midwestern Chapter Meeting, Pfister Hotel, Milwaukee, Wis., Feb. 1-3.

New England Nurserymen's Association Annual Convention, Copley-Plaza Hotel, Boston, Mass., Feb. 7-10.

American Sod Producers Association Mid-Winter Conference, Sheraton Harbor Island Hotel, San Diego, Cal., Feb. 9-11.

American Society of Consulting Arborists Annual Meeting, Don CeSar Hotel, St. Petersburg Beach, Fla., Feb. 10-12.

The Irrigation Association Annual Irrigation Conference, Salt Lake Hilton Hotel, Salt Lake City, U., Feb. 13-15.

National Arborist Association Annual Meeting, Don CeSar Hotel, St. Petersburg Beach, Fla., Feb. 13-17.

Canadian Nursery Trades Association Conference and Trade Show, Edmonton Plaza Hotel, Edmonton, Alta., Canada, Feb. 16-18.

American Institute of Landscape Architects 20th Annual Convention, South Coast Plaza Hotel, Costs Mesa, Cal., Feb. 17-19.

National Landscape Association and Garden Centers of America Joint Management Clinic, The Galt House, Louisville, Ky., Feb. 20-23.

American Society of Golf Course Architects 31st Annual Meeting, Hilton Head, S.C., Feb. 20-25

Midwest Regional Turf Conference, Purdue University, West Lafayette, Ind., Feb. 28-Mar. 2.

Canadian Golf Superintendents Association 28th Annual Turfgrass Show, Calgary Inn. Calgary, Alberta, Canada, Mar. 14-16.

HOW TO TOP DRESS 18 GREENS FAST.

USE YOUR CUSHMAN.

It's simple to do. Just place the top dresser attachment on the back of your 18 hp Turf Truckster chassis with the optional PTO, insert two pins, connect the sprocket drive chain to the PTO, and you're ready to work.

You save money as well as time. The Cushman top dresser eliminates the need for expensive, slow-moving, self-powered units. You use an existing power source to economically and quickly spread a variety of materials.

Your operator moves rapidly from green to green, with no time-consuming walking or laborious loading and unloading of extra equipment. He merely sets the metering gate and the engine/ground speed governor for an exact spread thickness. The moving belt and brush dispense materials uniformly in a smooth 31½-inch swath.

And now we've added improvements that make the top dresser even better.

The unit mounts directly on the chassis, without an extra frame. And the new system uses a rubber fabric conveyor belt to carry material to the gate. It's quieter, with reduced maintenance and longer life than the previous design. Plus, it enables you to spread materials from rock salt for icy sidewalks to fine, powderized soil on greens or tees.

Like all Cushman equipment, the top dresser and Turf-Truckster are built to last. So you get an efficient system that will handle just about any spreading job for years to come. With other accessories, your Cushman can spray, spike, aerate, and dump. Use it. It's more than basic transportation. It's a total turf-care system. Write for your Cushman Turf catalog today.

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People on the Move

Gary Holland has been named general manager of the Whirl Trim division of **The Toro Co.** He will be headquartered in Eden Prairie, Minn. Holland graduated from the University of Missouri as a mechanical engineer. He also holds an M.B.A. from Purdue University.

Doyle C. Jones has been elected president of the **Florida Turfgrass Association.** A landscape superintendent at Walt Disney World, Jones has served as director, secretary-treasurer and vice president.

Doyle Jones

He will serve a one-year term as president.

Randy F. James has joined the Chemagro agricultural division of **Mobay Chemical Corp.** as a sales representative. He received a B.S. from the University of South Dakota.

Joseph Gent has been promoted to branch manager of the Minneapolis distribution center of the **Thompson-Hayward Chemical Co.** In his new position, Gent will be responsible for the sale and administration of the company's line of agricultural, industrial and textile supplies.

Thomas W. Dlugos has been promoted to northern regional sales manager of the agricultural business group of **Velsicol Chemical Corp.** He received his B.S. in biology/conservation from Wisconsin State University.

Ronald S. Leafblad has been named president and general manager of **Ag-Chem Equipment Co., Inc.** Leafblad's experience includes his most recent position with Toro as group vice-president-outdoor equipment group. Previously he served as division president and vice president of marketing for White Motor Corp.

Joining the agricultural division of **Ciba-Geigy Corp.** as field sales representative in northwest Missouri is **Dennis Gray.** Gray was a district sales manager with Columbiana Seed Co. He holds a B.S. in agricultural mechanization from the University of Missouri.

John Stark has been appointed marketing manager of the outdoor power equipment division of **J I Case Co.** Stark, who attended the University of Wisconsin, was formerly a materials manager for that division.

Gary Custis, Dick Evenson and **Gregg Deegan** have been named technical representatives for the ProTurf division of **O. M. Scott and Sons.**

Custis recently earned a master's in agronomy from Virginia Polytechnic Institute and State University. Evenson comes to ProTurf after 25 years in the Air Force. A member of the Air Force Golf Course Council, he most recently supervised the golf course at Dover AFB, Del. Deegan is a former golf course superintendent.

Dick Evenson

Bob Miller has joined **Lakeshore Equipment & Supply Co.** as eastern manager for the company's LESCO line. A Clemson University graduate, Miller is a specialist in agronomic fertilizer and turfgrass management.

Robert DeCicco has been promoted to marketing manager for the agricultural chemical division of **Thompson-Hayward Chemical Co.** In his new capacity, DeCicco will plan and coordinate the overall marketing plan for proprietary agricultural chemicals.

Diamond Shamrock Corp. has named **Charles E. Osgood** as commercial development technical representative for the northwest territory. Osgood will be responsible for coordinating university, state and inhouse field development activities for the company's agricultural chemical products in the northwest. He holds a B.S. in Entomology from the University of Maryland and is working toward a master's in entomology at Oregon State University.

EPTC in starch form is more persistent

Losses of the herbicide EPTC in or on the soil surface can be greatly reduced when used in a new starch encapsulated form, research at Purdue University shows. EPTC (S-ethyl dipropylthiocarbamate) is used to control many grass and broadleaf weeds.

Findings in the study, which sought to establish the effectiveness and persistence of the starch form of EPTC, were presented recently by Dr. Marvin M. Schreiber, Agricultural Research Service-U.S.D.A. plant physiologist at Purdue.

Speaking to the North Central Weed Control Conference, Dr. Schreiber pointed out that EPTC has some drawbacks in the emulsifiable concentrate (EC) liquid form.

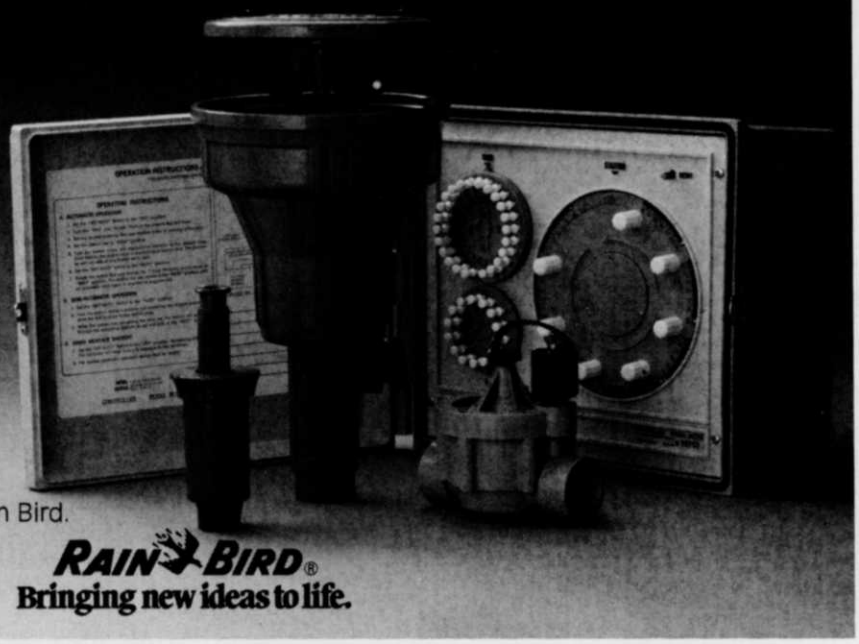
"Because of its volatility in the liquid form, EPTC must be immediately incorporated into the soil after application," says Schreiber. "Furthermore, it is readily lost if applied to wet soil surfaces or if the soil becomes wet immediately after its application."

Research at Purdue demonstrated that EPTC in double starch encapsulated granules was six times as effective as an equivalent amount of the liquid form and three times as effective as twice as much of the emulsifiable concentrate, when applied three pounds to the acre.

The plant physiologist noted that excellent control of all vegetation (in the experimental plots) was obtained 105 days after treatment, using six pounds per acre of the double starch form.

Schreiber concluded that "the effectiveness and persistence of this new formulation may be extremely valuable in treatment for weeds that germinate over extended periods of time."

Rain Bird's new sprinkler system is priced to be right at home in your neighborhood.



Our new residential system is economically priced to keep your landscape bids very competitive. Without sacrificing the high performance you expect from Rain Bird.

Specify a home sprinkler system that includes our quality components — economical RC7 automatic controller; EV100 control valve; 1511 Pop-A-Way® sprinkler, or 1800 pop-up spray head. Each is expertly built for economical, reliable installations.

When you're looking for a residential system in an affordable neighborhood, move right in with Rain Bird.

Contact your local Rain Bird distributor for more details.

RAIN BIRD®
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Green is beautiful with the Diamond Shamrock Turf Care System.

For beautiful results, there's no beating the Diamond Shamrock Turf Care System. The system: DACTHAL®, DACONATE®, DACAMINE®, and DACONIL 2787®. It's the system you need for almost total control of weeds and fungus diseases.

Daconil 2787 fungicide. Daconil 2787 is available in convenient flowable and wettable powder form. This popular broad-spectrum fungicide has been a leader for years in disease control. It controls 9 fungus diseases that plague you on greens, fairways and tees. And, Daconil 2787 can be used from spring to fall, even in hot, humid weather.

Dacthal, the preemergence turf herbicide. Dacthal performance is the standard by which many others rate their herbicides. Dacthal kills annual weeds as they germinate. Stops crabgrass, *Poa annua*, foxtail, and 15 other annual pests in turf and ornamentals. It is

Circle 120 on free information card

available in wettable powder and granular form.

Dacamine, the postemergence herbicide. Controls knotweed and other broadleaf weeds in fairways and roughs. Dacamine is a non-volatile diamine formulation of 2,4-D. Won't vaporize, even in hot weather . . . just avoid spray drift and follow label directions. Dacamine penetrates waxy leaves and translocates to the roots, killing the weed all the way down. Reduces the chances of regrowth.

Daconate 6, the postemergence herbicide. Finish off the stragglers with Daconate. It's the final touch in your weed control program. It gets rid of *nutsedge,* crabgrass, goosegrass, chickweed, wood sorrel and other tough, grassy weeds.

That's Diamond Shamrock Turf Care . . . the weed and disease program for professional turf. Contact your turf chemicals supplier.

Agricultural Chemicals Division sales offices: Three Commerce Park Square, 23200 Chagrin Blvd., Beachwood OH 44122; 1401 W. Paces Ferry Rd. NW, Atlanta GA 30327; 5333 Westheimer, Suite 850, Houston TX 77056; Commerce Plaza Bldg., 2015 Spring Rd., Oakbrook IL 60521; 617 Veterans Blvd., Redwood City CA 94063.

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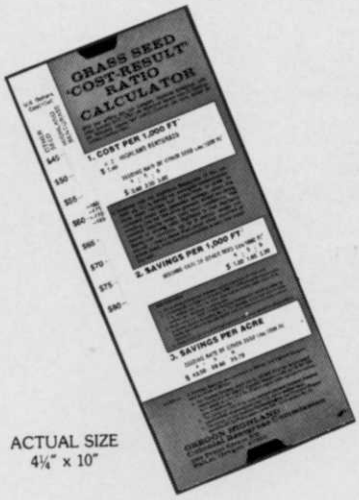

ACTUAL SIZE
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Budgeting is a Breeze with this Calculator

It's Yours Free . . . on Request

Here's a cost-calculator with which you can instantly compare the **actual cost** of various grass seeds.

Think on it a moment and you'll agree that cost per pound is only one factor in the cost equation. For a given price per pound you're also buying a given number of potential grass plants.

So, as in the case of Highland Colonial Bentgrass with its 8 million seeds per pound, you are buying a huge potential. Other grasses, which might cost less per pound may also have less potential grass plants so that from a practical standpoint they're more expensive than Highland.

Why not write for our free calculator. You'll find it a handy, fast method of comparing **actual costs** of planting bluegrass, ryegrass, bentgrass and fescue.

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Repairing irrigation pumps can increase your profits

Repairing worn irrigation pumps is a profitable move, according to U. S. Department of Agriculture researchers.

Research on a well at Texas A&M University Research Field at Etter proved this beyond a doubt. Having pumps in good repair was good business before high priced energy, but is now a necessity say Dr. Arland Schneider, Agricultural Research Service Engineer, and Dr. John Shipley, Texas Agricultural Experiment Station Economist, from the USDA Research Center at Bushland.

They carefully measured pump efficiency and cost and found that replacing a worn-out pump bowl assembly decreased electricity cost from $22.48 to $15.69 per acre-foot. Calculations showed that reduced electricity cost will pay for the repairs in the 1977 pumping season.

The old pump at the Etter Research Field was installed in 1964, and pumped 1,000 gallons per minute until 1972. Then it started pumping erratically and dropped to 500 gallons per minute by 1976, according to Dr. Shipley.

That was not enough water to carry out experiments at the Research Field. Rather than just change the pump, Shipley took the problem to Dr. Schneider. They decided to do a thorough study on the pump to determine both energy cost and efficiency of operation. With good information in hand, the scientists could then calculate the profitability of making repairs.

The worn-out pump produced 500 gallons per minute, and lifted water 290 feet, but the pump operated at only 49 percent efficiency. Installing the new pump bowl assembly increased the pumping rate to 750 gallons per minute. With a higher pumping rate, drawdown increased and total lift was 325 feet. Under these conditions, pumping efficiency was increased to 79 percent.

Repairs cost $3,228.00, but the scientists figured that repayment would take only 143 days of pumping.

The researchers point out that water cost can be calculated rather easily. Pumping rate, energy consumption, and energy cost must be known or determined. Accurate pumping rates can be measured with an inline propeller-type meter.

Water meters can be equipped with quick couplers and placed anywhere in a surface irrigation pipe. The meter records the number of gallons of water passing through the pipe. Keeping records for one hour gives an accurate output for a well. "A meter costs about $400.00 but would be a good investment," Dr. Schneider says. "Knowing the amount of water being applied to crops is just good business," he continued.

Keeping track of natural gas or electrical energy use for at least 2 hours on company meters gives an accurate measure of energy consumption. The cost of fuel or electricity must be known also. An acre-inch of water is 27,000 gallons. With these figures in hand, a little arithmetic gives the cost of an acre-foot of water.

The following calculations were made by Schneider and Shipley before repairing the well at Etter. It took 64.8 kilowatt hours of electricity to run the pump one hour. Electricity cost 3.2 cents per kilowatt hour. Multiplying the two figures gives a pumping cost of $2.07 per hour. At 500 gallons per minute, the well produced 30,000 gallons an hour. Dividing 27,000 into 30,000 gallons shows that the well pumps 1.11 acre-inches per hour. Water cost per acre-inch is $2.07 divided by 1.11 or $1.87. Multiplying $1.87 by 12 shows that cost per acre-foot of water is $22.44.

Calculating pump efficiency is more complicated and the two scientists suggest obtaining outside help.

Mix the perfect lawn with FYLKING.

This little Swedish beauty brought a new dimension to the turf grass industry. Fylking Kentucky bluegrass, with its greater density of rhizomes and root system, mixes with other fine lawn grasses to produce a lawn you'll always be proud of!

You'll never be plagued with annual bluegrass (*Poa annua*), bentgrass or short-awned foxtail when you plant Fylking. It is your guarantee of physically pure and genetically true seed.

Add the great beauty inherent to Fylking: brilliant green color in early spring, in summer heat, and into late fall; low-growing, fine-textured leaves that thrive mowed low as 1/2-inch; thick, luxuriant turf. Fylking is more resistant to disease, drought, heat, cold, smog, traffic and weed invasion.

Cost? Fylking seed costs less than most other elite bluegrasses.

A healthy, beautiful base for your lawn seed mix, ask for the Swedish beauty, Fylking Kentucky bluegrass.

FYLKING KENTUCKY BLUEGRASS U.S. Plant Patent 2887

Another fine, quality-controlled product of Jacklin Seed Company.

Fylking's thick, brilliant-green, fine-textured, low-growing leaves and dense, tight-knit rhizomes and root system make superior turf.

Fylking plants are started from "original" breeder's seed in sterile green house media, then transplanted to fumigated soil in isolated breeders block for seed increase.

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ROSS SUPER Tree Stakes™

Here's great news you can stake your professional reputation on!

The ROSS Super Tree Stakes, with their pre-measured once-a-year formulation work on trees, evergreens, shrubs and bushes. Our high food value formulation 16-10-9 plus Iron and Zinc, helps promote fast, healthy growth.

These all-purpose stakes will help you cut costs, too . . . Each case of 160 stakes is enough to feed over 35 3″ diameter trees. One application of this quality formula usually lasts all season.

Made to the exacting standards Ross Daniels, Inc. is noted for, these new stakes can be used either spring or fall, whenever time is most available to you and your crews.

Simple and easy to use, you just drive three Stakes for every 2″ of tree trunk diameter into the ground at the tree drip line. Water does the rest, carrying plant food to the feeder roots.

Be sure to ask for *ROSS* Super Tree Stakes. Available at your regular Ross distributor or write:

Ross Daniels, Inc., P.O. Box 430, West Des Moines, Iowa 50265

Circle 128 on free information card

Dept. of Roads

Neb. weed control plan works well

Richard W. Gray Jr., agronomist for the Nebraska Department of Roads, reported on the "largest" single weed control program in Nebraska at the 1976 North Central Weed Control Conference Dec. 7-9.

Weed scientists from 14 states and three Canadian provinces participated in the conference.

Gray stated that the Nebraska Department of Roads controls noxious weeds such as musk thistle on the land adjacent to 10,000 miles of roads comprising some 180,000 acres of right of way.

The department's right of way management policy has been effective in greatly reducing the time and money spent on the control of noxious weeds, Gray said. The program consists primarily of seeding to native and adapted grasses combined with a limited mowing policy.

When necessary, such a system is augmented by spraying contracts with some 78 of the 93 county weed control authorities. Most of the spraying utilizes the 2,4-D Amine and the more toxic chemicals are avoided, he said.

The seeding and limited mowing policy has been widely acclaimed by conservationists, bird lovers and wildlifers because of its effectiveness in providing undisturbed nesting and loafing cover for upland game birds. The department has received at least two awards from wildlife organizations for its efforts in this direction.

Though the department has made great progress in lowering weed control costs, every farmer, rancher and lawn owner is aware that it does cost real money. The department spends about 60¢ per acre annually or a total of $90,000 to $120,000.

Gray summarized the program as based on good turf maintenance, proper management, judicious use of chemicals and continuous cooperation with county weed control authorities and the department's thousands of "neighbors."

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Every customer wants the very best fertilizers for their lawn. Why? Because today everyone is green conscious. With IBDU and PAR EX fertilizers, you can provide the most complete, balanced nutrition available for turf and ornamentals.

Month after month, IBDU and PAR EX fertilizers release just enough nutrients to keep turf and ornamentals green and hardy. IBDU, unlike all other slow release nitrogens, is activated by soil moisture, not soil bacteria. It releases at an even, steady rate that can't be hurried or slowed by extremes in temperature. Precision mixed with other nutrients, gives you the best balanced fertilizer available today.

Start your customers out with a nutrition program that includes IBDU and PAR EX fertilizers. Your customers will like the results. And you'll like the added green. Contact your PAR EX distributor or call us, 312/431-2509.

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PROFESSIONAL PRODUCTS

Swift Agricultural Chemicals Corporation
Chicago, Illinois 60604

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Radiation may be key to better turfgrasses

Radiation treatment can be used to overcome genetic barriers to the future improvement of turfgrasses, according to Dr. Jerrel B. Powell, a research geneticist with USDA's Agricultural Research Service (ARS).

In tests conducted at ARS's Beltsville Agricultural Research Center, Beltsville, Md., Dr. Powell used gamma radiation to induce genetic mutations in commercial varieties of bermudagrasses.

"Bermudagrass hybrids are the mules of the grass world," Dr. Powell said. "They are sterile and can have no further offspring because of their particular chromosome makeup, resulting from their diverse and mixed parentage."

Mutation breeding is one way out of this genetic dead end. The technique involves exposing the root stems of bermudagrasses to gamma radiation. The radiation treatment causes the chromosomes of the sterile grasses to break up, and the genetic material to be rearranged, producing combinations that would be rare in nature.

"Radiation speeds up the mutagenic process. Within a single year you can obtain many hundreds of mutations rather than the one or two that you might get from an untreated natural populations," Dr. Powell said.

From these mutants, those grasses showing desirable traits such as dwarfism, deep green color, or winter hardiness, can be selected for development as a new variety. Because the bermudagrasses are sterile, it would be impossible to bring out these traits with conventional breeding.

Bermudagrasses make good sod. They can be mowed close and can withstand heavy wear. They are relatively resistant to diseases, insects, drought and high temperatures. Because of these many desirable traits, bermudagrasses are widely used on golf courses, athletic fields, lawns, and highway rights-of-way throughout the southern region of the United States.

Mutation breeding technology has already been used by European researchers to develop new varieties of potatoes, ornamentals, fruits and cereals. With the exception of sugarcane, however, it has not yet been extensively applied to grasses such as bermudagrasses which reproduce form sprigs or sod.

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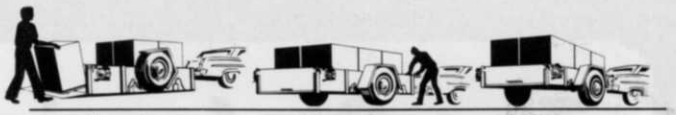
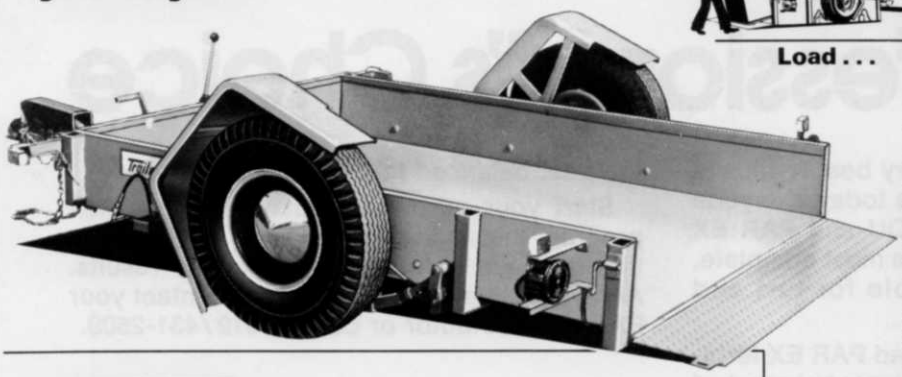
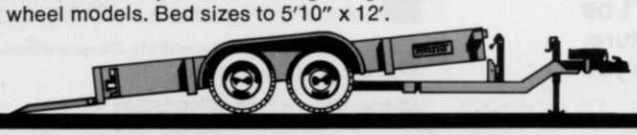




That's all there is to moving your equipment anywhere you want to. This unique Trailevator lowers to ground level for fast 'roll-aboard' loading, then lifts its own load to hauling position in just seconds. Lifts and lowers without uncoupling from towing vehicle. Standard trailer hitch attaches to car, truck or tractor. Four models available. Two capacities: 3,000 lbs. and 2,000 lbs. Bed sizes to 5'10" x 10'.

TILTSTER ***The low bed trailer that tilts.***

Drop-axle, tilt-type trailer handles loads to 5,000 lbs. Simple, one-man operation. Easy access, tailgate ramp for ground level or low platform loading. Single and tandem wheel models. Bed sizes to 5'10" x 12'.



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MANHATTAN

Perennial Ryegrass

School grounds in St. Paul, Oregon gets plenty of traffic but still looks great.

Manhattan **fairways** at Elkhorn Valley Golf Course, Mehama, Oregon. Imparts beauty and wear tolerance to this mountain course.

Manhattan Perennial Ryegrass has those desirable characteristics long sought in a turf grass.
Consider these data facts in your turf program:

- Superior fast establishment.
- Long term performance.
- Depth of crown assures better recovery from turf damage, greater wear tolerance, holds better under short mowing.
- Good density . . . more competitive with unwanted weeds and grasses.
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- Resistant to brown patch.
- Dark green color.
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- Fine leafed.

Manhattan fine leaf perennial ryegrass is the versatile grass. Excellent for golf tees and fairways, parks and athletic fields, home lawns. Developed at Rutgers University, New Brunswick, New Jersey, grown in Oregon under rigid certification and quality control.

Home lawn near Woodburn, Oregon after three years in 100% Manhattan.

Sprague **football stadium**, Salem, Oregon holds up well even in the soaking rains of Oregon's fall months.

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Model 21F35 illustrated

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- Choice of 4 cycle, 3.5 or 5 hp Briggs & Stratton engine with high inertia flywheel.
- Heavy gauge steel handle folds down without tools for easy transport and storage. Rigid "T" type handle also available.
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Beatrice, Nebraska 68310

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Capillary watering economical for container stock irrigation

Capillary watering, commonly used in Europe, and now becoming popular with florists in this country is a method of crop irrigation which offers the nurseryman an easy, economical way of irrigating container stock.

Expenses are lowered because a smaller initial investment is required to establish the system vs. other methods and considerably less water is needed. Furthermore, subirrigation lowers the incidence of foliar diseases thus less spraying is required.

The procedure requires a level bench or ground bed, a layer of poly film placed over the bench or bed and a capillary mat on the poly along with a means of irrigating the mat.

The bench or ground bed must be level to support the mat evenly to prevent puddling.

Plywood, snow fence, close spaced slatted bench material, or fairly compact gravel can serve as a base.

Polyethylene of any color and thickness is placed over the base to serve to retain the water and permit it to spread sideways under the mat. The capillary mat is located over the poly and plants placed on the mat.

Mats are kept moist with irrigation through spaghetti tubes or more commonly Chapin's twin-wall or DuPont's Via-Flo tubing. Since it is necessary to keep the mat at or near saturation, the water can be allowed to run all day or put on a time clock operating a solenoid valve. Typically no more than 5-6 pounds pressure is needed with Via-Flo or Twin wall tubing.

At Ohio State University a study was initiated in the container nursery to evaluate the growth of Royal Beauty Cotoneaster produced in 2 container types, 2 container sizes, on several capillary mats on a bench and ground bed.

The plants were potted and placed outside on the mats April 23, and evaluated for vegetative growth Oct. 8, 1976. The growing media was Metro Mix 300 fertilized with Osmocote 18-6-12. One-half of the plants were grown on an expanded wire, 18" raised bench 48' long by 4' wide covered with clear poly.

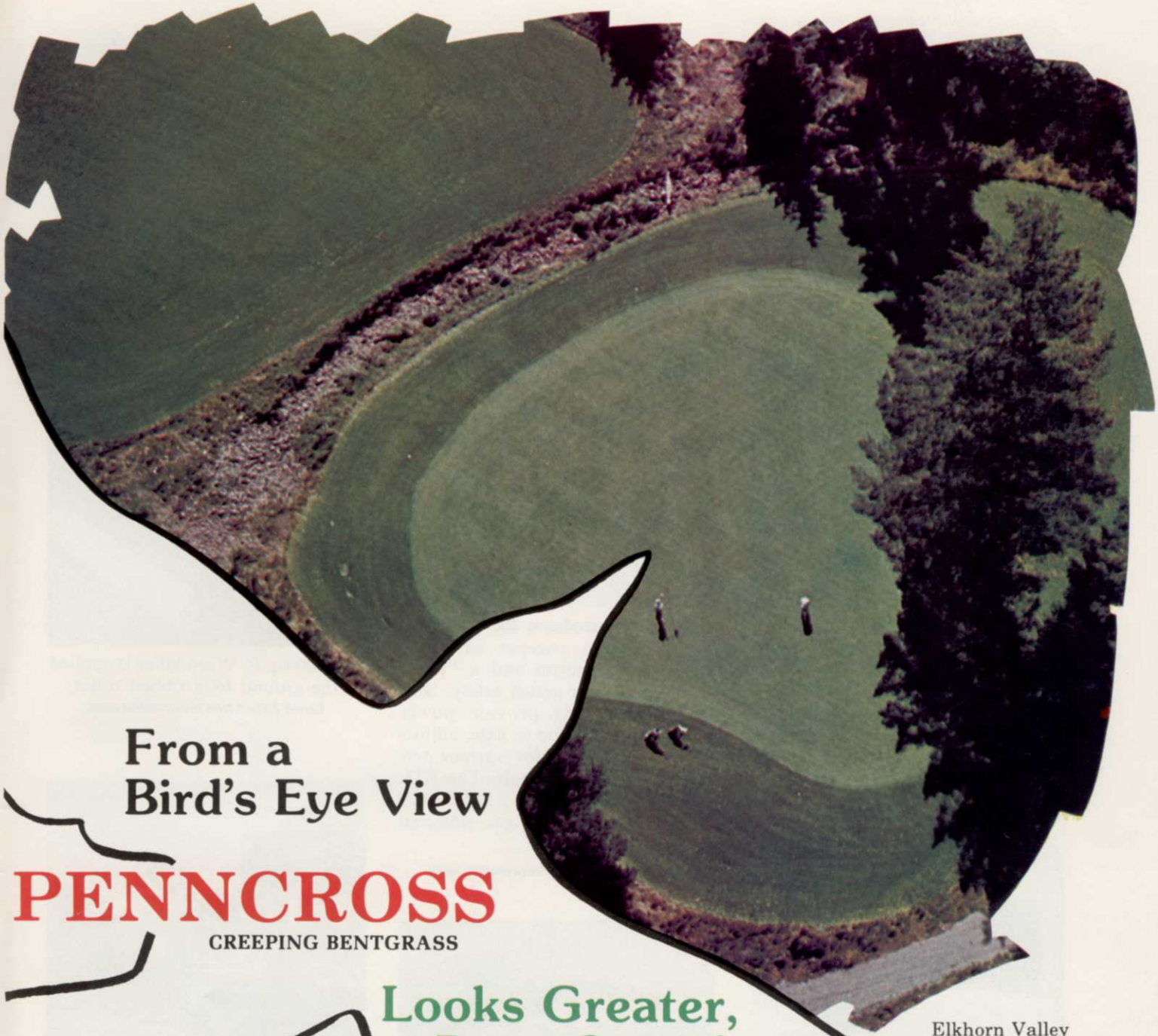
The remaining plants were placed on a 3-inch gravel ground bed of similar dimensions leveled and covered with clear poly. The mats evaluated on the bench were: Water-Mat (Pellon Corp.), Vattex-P (U.S. Vattex), Simtrac No. 202 (Simtrac, Inc.) Jednak Thick (not commercially available), Weedchek (Certain-Teed) and Eddymat (F. R. Young Co.) All of the mats except Simtrac and Jednak Thick were evaluated on the gravel bed.

The mats were kept moist via Via-Flo tubing with 2 lines per 4' wide bench or bed operated at 4 to 6 hours per day from a time clock. However, this did not supply all the water needs and plants were watered on an average of once a week from overhead.

The cans were Zarntainer No. 300 (1 gal.) and No. 800 (2 gal.) with holes along the base and one in the underside. Also used were Polytainer No. 1 (1 gal.) and No. 2 (2 gal.) with holes only along the base. Ten 1-gal. Cotoneaster dammeri 'Royal Beauty' and 6 2-gal. cans per container type and size were placed on each mat on both the bench and gravel bed.

Royal Beauty Cotoneaster was selected because it is a rapid growing plant with a greater water requirement than many other plants. Liners from 1975 summer cuttings were placed in all containers. All plants were irrigated thoroughly from above at the time of placement to initiate capillary action throughout the media and mat.

In summary, capillary mats can be satisfactorily used as an aid in the production of container grown Royal Beauty Cotoneaster. The mats were kept moist for 4-6 hours per day (4 hours when the plants were smallest) utilizing time clock controlled Via Flo tubing together with approximately weekly supplemental overhead irrigation.



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Products

Massey-Ferguson introduces the new-from-the-grass up MF 1450 and MF 1650 tractors. Both are designed for a wide variety of lawn care jobs. A 650 lb. capacity, 3-point hitch and rear PTO are available as options. At 14 and 16 hp, they come with hydraulic implement lift and front belt-driven implement device.

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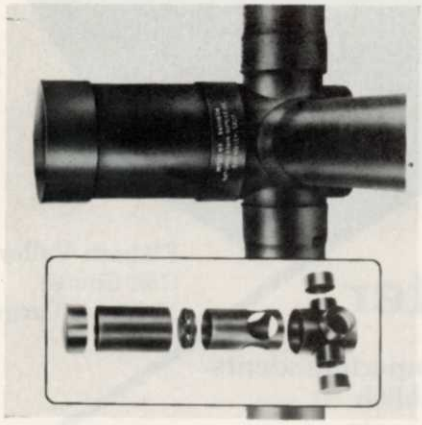

National Drain Supplies has a new Spee-D-Valve diverter valve molded in ABS plastic. Spee-D-Valve consists of a four-way distribution box, diverter valve stem, diverter valve shield, valve shield cap and outlet caps. Three interchangeable diverter valve stems permit positive flow control from the distributor box to any combination of one, two or all three outlets. For use in irrigation and drainage systems as well as septic tank leach field control.

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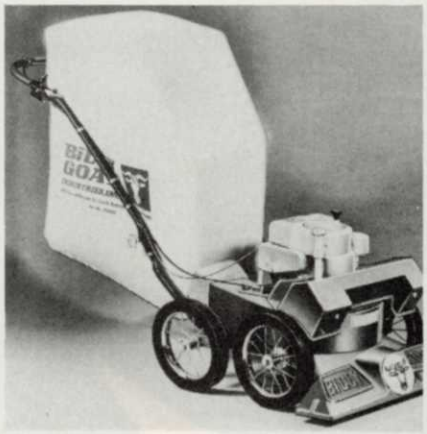

Billy Goat introduces the KD-50SP model suction sweeper with free wheeling in neutral and a "deadman" clutch for added safety. Self-propelled chains provide power takeoff from engine to axle, adjustable height levels for various terrain, handlebar controls. The KD-50SP is powered by a 187 CC's Briggs and Stratton gas powered engine.

Circle 703 on free information card

Hustler's new Catcher/Compactor simplifies disposal of grass clippings and lawn debris without the use of auxiliary power or noisy blowers. It relies on tractor drive wheels for paddle conveyor power.

Circle 704 on free information card

Vandermolen Corp. announces a new 27 in. DRIFTMASTER with 5.5 gal. capacity to allow coverage of 5 to 6,000 sq. ft. Weed killer is applied to the ground by a ribbed roller.

Circle 705 on free information card

A new turf vacuum that uses an independent power source is now available from Jacobsen as an attachment to their Out Front Commercial riding rotary mower. The "Turf Vac" has a 1-cu. yard hopper that attaches to the back of the Out Front Commercial and a 7 hp Kohler engine that attaches to the machine's right side. Power is ample for picking up small debris as well as clippings and leaves. Noncorrosive materials are used wherever moisture might be a problem.

Circle 706 on free information card

Healthy little beauty likes shade!

What a beauty little Glade Kentucky bluegrass has turned out to be! A fine, healthy specimen, Glade has a higher level of resistance to powdery mildew, and performs better than many other Kentucky bluegrasses in up to 60% shade as well as open sun. Glade, a Rutgers selection (nationally tested as P-29), has improved resistance to stripe smut and leaf rust. Midwestern and Northeastern university tests indicate that Glade has better than average resistance to Fusarium blight.

Glade is one of the fastest germinating bluegrasses, quickly forming a thick rhizome and root system. A dense, low-growing, leafy turf, Glade has an attractive medium to dark green color.

Glade Kentucky bluegrass is your guarantee of physically pure and genetically true seed. You won't be seeding annual bluegrass *(Poa annua)*, short-awned foxtail or bentgrass when you plant Glade. Specify this healthy little beauty in your next lawn seed mix. It blends beautifully with fine fescues and other elite bluegrasses, persists in shade when many others weaken. Glade Kentucky bluegrass is available at your local wholesale seed distributor. Insist on Glade in your mix.

Another fine, quality-controlled product of Jacklin Seed Company.

Glade

KENTUCKY BLUEGRASS

U.S. Plant Patent 3151

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When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, Dorothy Lowe, Box 6951, Cleveland, Ohio 44101.

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USED EQUIPMENT

FOR SALE: 2 used aerial baskets — 50 ft. working height, 2 Asplundh brush chippers. Bean sprayer, 35 G.P.M. Vermeer stump cutter 1560. Parkway Tree Service, Milwaukee, Wisconsin. Phone 414 257-1555.

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5 FT. BRILLION grass seeder with 3 point hitch $500.00. Ryan sod cutter with roll Ryder attachment, $1000.00. Phone 815 427-6147.

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SOD QUALITY Seeds Merion, Fylking, Delta, Park, Newport, Nugget, Adelphi, Cheri, Glade and Baron bluegrasses also fine fescues. Manhattan rye grass. Custom mixing available. Michigan State Seed Co., Grand Ledge, Michigan 48837. Phone 517 627-2164.

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YEAR ROUND WORK A.A.A. Tree Service, Inc. of Florida. Looking for experienced top notch climbers with or without truck and equipment to work by the hour, on percentage or under Franchise in Florida areas. Also needed older men with sales ability. Mechanic with chain saw experience. Man to operate his own tree spade. Henry Hardy, Jr., P.O. Box 6173, Orlando, Fla. 32803. Phone 305 339-5242.

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Kay-Fries 43
F. D. Kees 60
Lakeshore 23, 46
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PBI Gordon 24, 25
Princeton 27
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Rhodia 16, 17
Ross Daniels 56
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Then compare the same operation with getting it done by one man and new Jacobsen equipment. You can see for yourself how time and money can be saved.

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Circle 124 on free information card

"When we include baron* in our bluegrass mixture, we know we can depend on the results."

That's what George Koziarz of Synnestvedt Landscape, Architects and Contractors has to say about baron.

The Synnestvedt operation serves the North Shore of Chicago and is based on a design-build concept. The backbone of the company. . .landscape architecture and contracting. . .is supported by a 300 acre nursery, a fully-equipped tree care division, a commercial landscape maintenance division and two rapidly growing garden centers.

Ralph Synnestvedt, Jr., son of the founder, has a reputation to live up to and landscape contracting plays a big part in keeping this reputation.

"This is just one of the many examples of estate landscape development where we use BARON Kentucky Bluegrass. Our customers demand the best and we give it to them."

"Since we began using BARON there are fewer problems. That means fewer call-backs. . .BARON seems to be much more dependable."

"We naturally use BARON in our own mixtures sold at the Synnestvedt's Garden Centers. We also use Jamestown Chewings Fescue, Yorktown and Manhattan Perennial Ryegrasses in these mixtures."

"I think the first thing we found best about BARON was its quick germination. Our type business calls for a quick cover. . .BARON is what we call an aggressive grass."

"We can make sure a customer has a beautiful lawn, but we can't guarantee it will hold up under his maintenance methods. We know BARON helps keep the lawn looking good even with the owner's less-than-professional maintenance. . .I guess it's something like extra insurance."

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*U.S. Plant Patent #3186, Dwarf Variety

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